Town of Halifax

Stormwater Management Program

For Coverage Under The

National Pollutant Discharge Elimination System (NPDES)
General Permit for Municipal Separate Storm Sewer Systems (MS4)

Town of Halifax
499 Plymouth Street
Halifax MA, 02338

EPA NPDES Permit Number MA041035

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Certification

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

Printed Name: Charlie Seelig

Signature:

Date: 6/28/2019

Background

The Town of Halifax (Halifax) understands the threat of pollution from stormwater and erosion. Halifax is committed to stormwater protection for the benefit of its residents, visitors, and the people of Massachusetts. Halifax's Stormwater Management Program (SWMP) outlines Halifax's existing and planned measures to address these threats and to comply with the National Pollutant Discharge Elimination System (NPDES) Phase II General Permit for Municipal Separate Storm Sewer Systems (MS4s).

Regulatory Context

The Stormwater Phase II Final Rule was promulgated in 1999 and was the next step after the 1987 Phase I Rule in EPA's effort to preserve, protect, and improve the Nation's water resources from polluted stormwater runoff. The Phase II program expands the Phase I program by requiring additional operators of MS4s in urbanized areas and operators of small construction sites, through the use of NPDES permits, to implement programs and practices to control polluted stormwater runoff. Phase II is intended to further reduce adverse impacts to water quality and aquatic habitat by instituting the use of controls on the unregulated sources of stormwater discharges that have the greatest likelihood of causing continued environmental degradation. Under the Phase II rule all MS4s with stormwater discharges from Census designated Urbanized Area are required to seek NPDES permit coverage for those stormwater discharges.

On May 1, 2003, EPA Region 1 issued its Final General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (2003 small MS4 permit) consistent with the Phase II rule. The 2003 small MS4 permit covered "traditional" (i.e., cities and towns) and "non-traditional" (i.e., Federal and state agencies) MS4 Operators located in the states of Massachusetts and New Hampshire. This permit expired on May 1, 2008 but remained in effect until operators were authorized under the 2016 MS4 general permit, which became effective on July 1, 2018.

Stormwater Management Program (SWMP)

The SWMP describes and details the activities and measures that will be implemented to meet the terms and conditions of the permit. The SWMP accurately describes the permittees plans and activities. The document should be updated and/or modified during the permit term as the permittee's activities are modified, changed or updated to meet permit conditions during the permit term. The main elements of the stormwater management program are (1) a public education program in order to affect public behavior causing stormwater pollution, (2) an opportunity for the public to participate and provide comments on the stormwater program (3) a program to effectively find and eliminate illicit discharges within the MS4 (4) a program to effectively control construction site stormwater discharges to the MS4 (5) a program to ensure that stormwater from development projects entering the MS4 is adequately controlled by the construction of stormwater controls, and (6) a good housekeeping program to ensure that stormwater pollution sources on municipal properties and from municipal operations are minimized.

The SWMP describes the activities and measures, or Best Management Practices (BMPs), that Halifax will implement to meet the terms and conditions of the permit. The SWMP has been prepared to comply with the overall general permit. Halifax will update and/or modify the document during the permit term as Halifax's activities are modified, changed, or updated to meet permit conditions. The main elements of the SWMP are organized by minimum control measures (MCMs), water supply protection measures, and additional BMPs for discharges to water quality limited waterbodies.

MCM 1: A public education program aiming to affect public behavior causing stormwater pollution,

MCM 2: An opportunity for the public to participate and provide comments on the stormwater program,

MCM 3: A program to effectively find and eliminate illicit discharges within the MS4,

MCM 4: A program to effectively control construction site stormwater discharges to the MS4,

MCM 5: A program to ensure that stormwater from development projects entering the MS4 is adequately

controlled by the construction of stormwater controls,

MCM 6: A good housekeeping program to ensure that stormwater pollution sources on Halifax properties and from town operations are minimized,

Water Supply Protection: Measures to protect surface public drinking water sources, and

TMDLs and Water Quality Impairments: Enhanced and additional BMPs to reduce pollutants of concern discharging to waterbodies with water quality impairments and Total Maximum Daily Loads (TMDLs) related to urban stormwater runoff.

Halifax MS4 Background

Water quality in Halifax is an important concern due to the recreational uses of Monponsett Pond and other area waterbodies. Additionally, Halifax falls within the watershed of Silver Lake, the drinking water source for Brockton, MA. Halifax was authorized to discharge stormwater under the 2003 MS4 Permit and is currently authorized under the 2016 MS4 Permit.

Halifax has many on-going programs to protect the water quality of water resources in and around the Town. Halifax participates in the Monponsett Pond Watershed Association, an advocacy group focused on protecting the water quality of the Pond. Frequent water quality testing is conducting throughout the summer months in the Pond to inform the public of the safety and condition of the Pond. Catchment areas and drainage infrastructure surrounding the Pond have been delineated to support the Town's efforts to identify sources of potential pollutants entering the Pond and impacting water quality. The Highway Department in Halifax conducts on-going maintenance of the drainage infrastructure in the Town, including cleaning sediment from the roads and catch basins and repairing deficient structures. The Board of Health ensures septic systems within in the Town, and especially around the Pond, are frequently maintained and functioning properly.

Through implementation of this SWMP, the existing programs to protect the water quality of water resources in Halifax will be enhanced and new programs will be added.

Small MS4 Authorization

Halifax submitted its revised Notice of Intent (NOI) on March 22, 2019. EPA granted Authorization to Discharge on May 30, 2019. The NOI and Authorization Letter can be found at the following web address:

- NOI: https://www3.epa.gov/region1/npdes/stormwater/ma/tms4noi/halifax.pdf
- Authorization Letter: https://www3.epa.gov/region1/npdes/stormwater/ma/tms4noi/halifax-auth.pdf

Stormwater Management Program Team

Steven Hayward
Highway Surveyor
Highway Department
(781) 293-1760
steve.hayward@halifax-ma.org

Charlie Seelig
Town Administrator
Town Administrator
(781) 294-1316
cseelig@town.halifax.ma.us

Cathleen Drinan
Health Agent
Board of Health
(781) 293-1738
cdrinan@town.halifax.ma.us

Receiving Waters

- *The following table lists all receiving waters, impairments and number of outfalls discharging to each waterbody segment.*

Waterbody segment that receives flow from the MS4	Number of outfalls into receiving water segment	Chloride	Chlorophyll-a	Dissolved Oxygen/ DO Saturation	Nitrogen	Oil & Grease/PAH	Phosphorus	Solids/TSS/Turbidity	E. Coli	Enterococcus	Other pollutant(s) causing impairments
East Monponsett Pond	32										Category 4A: Mercury in Fish Tissue
West Monponsett Pond	22						X				Category 5: Excess Algal Growth and Secchi Disk Transparency
Plymouth Street Pond	22										Category 4C
Winnetuxet River	21										Category 2
Silver Lake	11										Category 3
Taunton River	5										Category 2
Elm Street Pond	2										Category 3

Eligibility: Endangered Species and Historic Properties

The Town of Halifax completed the ESA eligibility process outlined in the MS4 Permit Appendix C. According to the U.S. Fish & Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) tool, potential habitat for Northern Long-eared Bat and the Plymouth Redbelly Turtle occur within Halifax.

In a letter dated September 24, 2018, USFWS issued a determination that stormwater discharge activities associated with the 2016 MS4 Permit may affect, but are not likely to adversely affect, certain species listed under the ESA when specific conditions are met. A copy of the letter is included within Halifax's NOI here: https://www3.epa.gov/region1/npdes/stormwater/ma/tms4noi/halifax.pdf
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In accordance with the above referenced USFWS letter, Halifax confirms that the following conditions are true:

1. All stormwater discharges are pre-existing or previously permitted by EPA;
2. Any planned operations and maintenance work covered by this permit will only affect previously disturbed areas where stormwater controls are already installed. In these situations, the chance of encountering any of the subject species is discountable;
3. The project implements EPA MS4 Best Management Practices (BMPs) and meets Clean Water Act and Massachusetts Water Quality Standards. Although permitted discharges may reach the environment used by these species, BMPs reduce pollutants to the extent that discharges are not known to have measurable impacts on these species or their habitat;
4. No new construction or structural BMPs are proposed under this permit at this time; and
5. Halifax agrees that if, during the course of the permit term, DCR plans to install a structural BMP not identified in the NOI, DCR will re-initiate consultation with the USFWS as necessary.

In accordance with the ESA eligibility process outlined in MS4 Permit Appendix C, Halifax certifies permit eligibility with the ESA under **Criterion B**.

USFWS Criterion B: *In the course of formal or informal consultation with the Fish and Wildlife Service, under section 7 of the ESA, the consultation resulted in either a no jeopardy opinion (formal consultation) or a written concurrence by USFWS on a finding that the stormwater discharges and discharge related activities are "not likely to adversely affect" listed species or critical habitat (informal consultation).*

National Historic Preservation Act (NHPA) Eligibility Determination

Halifax determined that operation of its MS4 system does not have the potential to cause effects on historic properties. Halifax does not plan to undertake any activity involving subsurface land disturbance less than an acre in the vicinity of historic properties. If, during the course of the permit term, the Town plans to undertake subsurface land disturbance less than an acre in the vicinity of a historic property, Halifax will assess the potential for the activity to affect the historic property and will consult with the Massachusetts Historical Commission as appropriate.

In accordance with the NHPA eligibility process outlined in the MS4 Permit Appendix D, Halifax certifies permit eligibility with the NHPA under **Criterion A**.

NHPA Criterion A: *The discharges do not have the potential to cause effects on historic properties.*

MCM 1 Public Education and Outreach

Permit Part 2.3.2

Objective

The objective of Halifax's public education and outreach program is to increase knowledge and change behavior of the public so that stormwater pollutants are reduced.

Program Overview

Halifax's public education program is structured in accordance with the MS4 Permit at Part 2.3.2 and with specific requirements for impaired waterbodies in MS4 Permit Appendix H. The messages target residents, businesses, institutions, commercial, and industrial facilities, and developers and focus on reducing stormwater pollutants that are most likely to be generated on these properties and/or to impact Halifax's receiving waterbodies. Topics may include:

- Pet waste,
- Erosion and sedimentation,
- Material and waste management,
- Lawn care, and
- Low Impact Development.

The educational messages will be distributed through a range of forums, selected to best reach each target audience. Each public education BMP has a measurable goal, which Halifax will assess annually to ensure that educational messages are reaching target audiences effectively.

The following table summarizes the educational messages, target audiences, and distribution schedule.

BMP	Target Audience	Schedule by Permit Year (Fiscal Year)				
		1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)
1.01: Spring Educational Message	Residents; Businesses, institutions, and commercial facilities	x	x	x	x	x
1.02: Summer Educational Message	Residents; Businesses, institutions, and commercial facilities	x	x	x	x	x
1.03: Fall Educational Message	Residents; Businesses, institutions, and commercial facilities	x	x	x	x	x
1.04: Residential and Commercial Educational Messages	Residents; Businesses, institutions, and commercial facilities		x		x	
1.05: Industrial Facility Educational Messages	Industrial facilities			x		x
1.06: Developer (construction) Educational Messages	Developers (construction)			x		x

BMP 1.01: Spring Educational Message

Description:

Halifax will distribute educational messages each Spring (March/April) highlighting proper use and disposal of grass clippings and proper use of slow-release and phosphorus-free fertilizers. Messages will be distributed via the Town of Halifax Facebook page, the Town Website, and/or brochures/pamphlets available at Town Hall.

Targeted Audience:

- Residents
- Businesses, institutions and commercial facilities

Responsible Department/Parties:

- Board of Health

Measurable Goal(s):

- Number of messages distributed

BMP 1.02: Summer Educational Message

Description:

Halifax will distribute educational messages each summer (June/July) highlighting proper management of pet wastes. Messages will be distributed via the Town of Halifax Facebook page, the Town Website, and/or brochures/pamphlets available at Town Hall.

Targeted Audience:

- Residents
- Businesses, institutions and commercial facilities

Responsible Department/Parties:

- Board of Health

Measurable Goal(s):

- Number of messages distributed

BMP 1.03: Fall Educational Message

Description:

Halifax will distribute educational messages each Fall (August/September/October) highlighting proper disposal of leaf litter. Messages will be distributed via the Town of Halifax Facebook page, the Town Website, and/or brochures/pamphlets available at Town Hall.

Targeted Audience:

- Residents
- Businesses, institutions and commercial facilities

Responsible Department/Parties:

- Board of Health

Measurable Goal(s):
- Number of messages distributed

BMP 1.04: Residential and Commercial Educational Messages

Description:

Halifax will post material on the town's website or social medial accounts, including information about lawn care, proper automotive maintenance, maintenance of septic systems, reducing the use of deicing materials, and/or Low Impact Development practices.

Targeted Audience:
- Residents
- Businesses, institutions and commercial facilities

Responsible Department/Parties:
- Board of Health

Measurable Goal(s):
- Distribute at least twice per permit term and spaced at least a year apart
- Number of views.

BMP 1.05: Industrial Facility Educational Message

Description:

Halifax will post pollution prevention information on the town's web site or social media accounts, including information about equipment maintenance, site landscaping, irrigation, waste disposal, chemical storage, and/or spill prevention and response.

Targeted Audience:
- Industrial facilities

Responsible Department/Parties:
- Board of Health

Measurable Goal(s):
- Distribute at least twice per permit term and spaced at least a year apart
- Number of views

BMP 1.06: Developer (construction) Educational Message

Description:

Halifax will distribute a handout highlighting erosion and sediment control with permits from the Planning Board. Messages on Low Impact Development practices will also be posted on the Halifax website.

Targeted Audience:

- Developers (construction)

Responsible Department/Parties:

- Planning Board

Measurable Goal(s):

- Number of handouts distributed
- Number of views

MCM 2 Public Involvement and Participation

Permit Part 2.3.3

Objective

Halifax's objective for its Public Involvement and Participation program is to engage the public in review and implementation of the SWMP.

Program Overview

The following table summarizes the public involvement and participation BMPs and schedule.

BMP	Schedule by Permit Year (Fiscal Year)				
	1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)
2.01: Public Review of SWMP	x	x	x	x	x
2.02: Water Quality Data Posting	x	x	x	x	x
2.03: Hazardous Waste Collection Days	x	x	x	x	x
2.04: Annual Report Public Review	x	x	x	x	x
2.05: Partnership with Monponsett Watershed Association	x	x	x	x	x
2.06: Halifax Cleanup Day	x	x	x	x	x

BMP 2.01: Public Review of Stormwater Management Program

Description:

Halifax will post its SWMP on the Town's website to allow for ongoing public review. When a new version of the SWMP becomes available, Halifax will post on the home page to notify the public that the SWMP is available for review. Contact information will be provided on the Town's website to allow the public to submit feedback on the SWMP on or before July 1, 2018 and update as needed. Halifax will allow annual public review and comment on the SWMP.

Responsible Department/Parties:

- Town Administrator

Measurable Goal(s):

- SWMP is publicly available on website
- Number of views
- Number of comments received

BMP 2.02: Water Quality Data Posting

Description:

Halifax will make bacteria and cyanobacteria water quality testing results for Monponsett Ponds available on the Town's public webpage during beach season (Memorial Day-Labor Day). Results will also be posted on social media.

Responsible Department/Parties:

- Board of Health

- Town Administrator

Measurable Goal(s):
- Number of views

BMP 2.03: Hazardous Waste Collection Days

Description:

Halifax will hold annual Hazardous Waste Collection Days to collect household hazardous waste and used oil.

Responsible Department/Parties:
- Halifax Recycling Center

Measurable Goal(s):
- Annual Hazardous Waste Collection Day held
- Number of residents participating

BMP 2.04: Annual Report Public Review

Description:

Halifax will post its MS4 Annual report on the Town's website each year to allow for public review.

Responsible Department/Parties:
- Town Administrator

Measurable Goal(s):
- Number of views

BMP 2.05: Partnership with Monponsett Watershed Association

Description:

Halifax will continue its partnership with the Monponsett Watershed Association.

Responsible Department/Parties:
- Town Administrator

Measurable Goal(s):
- Number of meetings attended

BMP 2.06: Halifax Cleanup Day

Description:

Halifax will continue to organize Halifax Cleanup Day, an annual event encouraging residents to help clean the town and ponds, typically held in the spring around Earth Day.

Responsible Department/Parties:

- Beautification Committee

Measurable Goal(s):

- Number of participants at annual event
- Amount of waste collected at annual event

MCM 3 Illicit Discharge Detection and Elimination (IDDE) Program

Permit Part 2.3.4

Objective

Halifax's objective for the IDDE program is to systematically find and eliminate illicit sources of non-stormwater discharges to its MS4 and to prevent such discharges.

Program Overview

The following table summarizes the IDDE BMPs and schedule.

BMP	Schedule by Permit Year (Fiscal Year)				
	1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)
3.01: IDDE Legal Authority		x			
3.02: Sanitary Sewer Overflow (SSO) Inventory	x	x	x	x	x
3.03: Map of Storm Sewer System	x	x	x	x	x
3.04: IDDE Program	x	x	x	x	x
3.05: Employee Training	x	x	x	x	x

BMP 3.01: IDDE Legal Authority

Description:

Halifax will develop an IDDE legal authority (bylaw) that will prohibit illicit discharges; investigate suspected illicit discharges; eliminate illicit discharges, including discharges from properties not owned by or controlled by the MS4 that discharge into the MS4 system; and implement appropriate enforcement procedures and actions.

Department Responsible for Enforcement:

- Town Administrator

Measurable Goal(s):

- Develop within 2 years of permit effective date (June 30, 2020).

BMP 3.02: Sanitary Sewer Overflow (SSO) Inventory

Description:

Halifax will develop an inventory of sanitary sewer overflows (SSOs) that have occurred over the past 5 years and will update that list annually. An SSO is a discharge of untreated sanitary wastewater from a municipal sanitary sewer. The SSO inventory will be included in the written IDDE Program (BMP 3.04).

Responsible Department/Parties:

- Board of Health

Measurable Goal(s):

- Complete within 1 year and update annually

SSO Reporting:

In the event of an overflow or bypass, a notification must be reported within 24 hours by phone to MassDEP, EPA, and other relevant parties. Follow up the verbal notification with a written report following MassDEP's Sanitary Sewer Overflow (SSO)/Bypass notification form within 5 calendar days of the time you become aware of the overflow, bypass, or backup.

The MassDEP contacts are:
Southeast Region: (508) 946-2750
20 Riverside Drive
Lakeville, MA 02347

The EPA contacts are:
EPA New England: (617) 918-1510
5 Post Office Square
Boston, MA 02109

BMP 3.03: Map of Storm Sewer System

Description:

Halifax will update its storm sewer map during IDDE program implementation. Mapping showing the storm sewer system map will be available for public viewing via a web map: http://ocpcrpa.maps.arcgis.com/apps/webappviewer/index.html?id=4d60e6cf4c8c4efea4b83472a0424be5. Halifax will incrementally add drainage structures and treatment facilities, with associated data, to its GIS map. As the map is further developed, Halifax will evaluate whether facilities and outfalls meet the MS4 Permit definitions for regulated outfalls. A regulated outfall is defined by 40 CFR § 122.2 as the point where the MS4 discharges to waters of the United States.

The Phase I map, scheduled to be completed by June 30, 2020, will include:

- Outfalls
- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- Halifax -owned stormwater treatment structures (e.g., detention and retention basins, infiltration systems, bioretention areas, water quality swales, gross particle separators, oil/water separators, or other proprietary systems)
- Waterbodies identified by name and indication of all use impairments as identified on the most recent EPA approved Massachusetts Integrated List of Waters report
- Surface public drinking water supplies, watersheds, and protection zones
- Initial catchment delineations. A catchment is the area that drains to an individual outfall or interconnection.

The Phase II map, scheduled to be completed by June 30, 2028, will include:

- Outfall spatial location (latitude and longitude with a minimum accuracy of +/-30 feet)
- Pipes
- Manholes
- Catch basins
- Refined catchment delineations. Catchment delineations will be updated to reflect information collected during catchment investigations
- Septic systems, where applicable

Responsible Department/Parties:

- Highway Department

Measurable Goal(s):
- Complete the Phase I map by the end of Permit Year 2 (June 30, 2020)
- Update of Phase II within 10 years of permit effective date (June 30, 2028)

BMP 3.04: IDDE Program

Description:

Halifax will create and implement written IDDE program including: ordinance, by-law, or regulatory mechanism, procedure for catchment investigations, outfall screening procedure for dry and wet weather; determine authority that will implement all aspects of the IDDE Program; conduct priority ranking of the outfalls discharging to the priority waterbodies; complete dry weather and wet weather screening of all outfalls, complete catchment investigations of entire MS4, and eliminate any identified illicit discharges.

The Halifax IDDE Plan is provided as Appendix A of this SWMP and provides the specific procedures, timelines, and responsible parties for implementing the IDDE program.

Responsible Department/Parties:
- Highway Department

Measurable Goal(s):
- Complete written plan within 1 year of the effective date of permit and update as required
- Number of illicit discharges identified and eliminated

BMP 3.05: Employee Training

Description:

Halifax will train employees on IDDE implementation and how to recognize and respond to illicit discharges and SSOs.

Responsible Department/Parties:
- Highway Department

Measurable Goal(s):
- Hold annual training
- Number of employees trained annually

MCM 4 Construction Site Stormwater Runoff Control

Permit Part 2.3.5

Objective

Halifax's objective for its construction stormwater runoff control program is to minimize or eliminate erosion and maintain sediment on site so that it is not transported in stormwater and allowed to discharge to a water of the U.S. through Halifax's MS4.

Program Overview

The following table summarizes Construction Site Stormwater Runoff Control BMPs and schedule.

BMP	Schedule by Permit Year (Fiscal Year)				
	1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)
4.01: Sediment and Erosion Control Bylaw		x			
4.02: Site Plan Review Procedures		x	x	x	x
4.03: Site Inspections		x	x	x	x

BMP 4.01: Sediment and Erosion Control Bylaw

Description:

Halifax will develop a Town bylaw which requires the use of sediment and erosion control at construction sites in accordance with 2.3.5 c. i. of the 2016 permit. In addition to addressing sediment and erosion control, the ordinance will include controls for other wastes on constructions sites such as demolition debris, litter and sanitary wastes.

Bylaw Link or Reference: *Under Development*

Department Responsible for Enforcement:

- Town Administrator

Measurable Goal(s):

- Develop within 2 years of permit effective date (June 30, 2020)

BMP 4.02: Site Plan Review Procedures

Description:

Halifax will develop town written procedures for site plan review and inspection and enforcement. The site plan review procedure will include a pre-construction review by the town of the site design, the planned operations at the construction site, planned BMPs during the construction phase, and the planned BMPs to be used to manage runoff created after development. The review procedure will incorporate procedures for the consideration of potential water quality impacts, and procedures for the receipt and consideration of information submitted by the public. The site plan review procedure will also include evaluation of opportunities for use of low impact design and green infrastructure. When the opportunity exists, Halifax will encourage project proponents to incorporate these practices into the site

design.

Halifax will conduct a site plan review on all projects requiring site plan review according to the procedures outlined above.

Responsible Department/Parties:

- Planning Board

Measurable Goal(s):

- Complete within 1 year of the effective date of permit
- Number of site plan reviews conducted annually

BMP 4.03: Site Inspections and Enforcement of Sediment and Erosion Control Measures Procedures

Description:

Halifax will complete written procedures of site inspections and enforcement procedures for and inspection and enforcement. The procedures for site inspections conducted by Halifax will include the requirement that inspections occur during construction of BMPs as well as after construction of BMPs to ensure they are working as described in the approved plans.

Procedures for inspections will be clearly defined including qualifications necessary to perform the inspections, the use of mandated inspection forms if appropriate, and procedure for tracking the number of site reviews, inspections, and enforcement actions. The procedures will clearly define who is responsible for site inspections as well as who has authority to implement enforcement procedures. The program will provide that Halifax may, to the extent authorized by law, impose sanctions to ensure compliance with the local program.

Halifax will inspect all construction sites over 1-acre as outlined in the above document and take enforcement actions as needed.

Responsible Department/Parties:

- Planning Board

Measurable Goal(s):

- Complete within 1 year of the effective date of permit
- Number and outcome of enforcement actions

MCM 5 Post Construction Stormwater Management in New Development and Redevelopment

Permit Part 2.3.6

Objective

Halifax's object for its post-construction stormwater management program is to reduce the discharge of pollutants found in stormwater to the MS4 through the retention or treatment of stormwater after construction on new or redeveloped sites and to ensure proper maintenance of installed stormwater controls.

Program Overview

The following table summarizes Post-Construction Stormwater Management BMPs and schedule.

BMP	Schedule by Permit Year (Fiscal Year)				
	1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)
5.01: Post-Construction Bylaw		x			
5.02: Street and Parking Lot Guidelines Report				x	x
5.03: Green Infrastructure Report				x	x
5.04: List of Municipal Retrofit Opportunities				x	x
5.05: Demonstration Project Installation					After permit period

BMP 5.01: Post-Construction Bylaw

Description:

Halifax will develop a town bylaw to address post-construction stormwater runoff from all new development and redevelopment sites that disturb one or more acre. Requirements in the bylaw for post-construction stormwater treatment will be in accordance with Section 2.3.6 a. ii. of the 2016 permit. Additionally, the bylaw will require the submission of as-built drawings following the completion of construction projects and ensure procedures are in place for long-term operation and maintenance of post-construction stormwater management practices. Halifax's bylaw will include a requirement that new development and redevelopment stormwater management BMPs be optimized for nutrient removal in watersheds of waterbodies impaired for nutrients. These include the Taunton River Watershed, which includes a downstream impairment for Nitrogen, and West Monponsett Pond Watershed, which is impaired for Phosphorous.

Department Responsible for Enforcement:

- Planning Board

Measurable Goal(s):

- Complete 2 years after effective date of permit.

BMP 5.02: Street Design and Parking Lot Guidelines Report

Description:

Halifax will review street and parking lot design guidelines and other local requirements that affect the creation that affect the creation of impervious cover to develop an assessment report. The assessment will help determine if changes to design standards can be made to support low impact design options, such as permeable paving and minimizing impervious surface. If the assessment indicates that changes can be made, the report will include recommendations and proposed schedules to incorporate policies and standards into relevant documents and procedures to minimize impervious cover attributable to parking areas and street designs. Halifax will implement recommendations, in accordance with the schedules contained in the assessment.

Responsible Department/Parties:

- Town Administrator
- Highway Department
- Planning

Measurable Goal(s):

- Complete 4 years after effective date of permit and implement recommendations of report.

BMP 5.03: Green Infrastructure Report

Description:

Halifax will develop a report assessing existing local regulations to determine the feasibility of making green infrastructure practices allowable when appropriate site conditions exist.

Responsible Department/Parties:

- Town Administrator
- Highway Department
- Planning Board

Measurable Goal(s):

- Complete 4 years after effective date of permit and implement recommendations of report

BMP 5.04: List of Municipal Retrofit Opportunities

Description:

Halifax will identify at least 5 town-owned properties that could be modified or retrofitted with BMPs designed to reduce the frequency, volume, and pollutant loads of stormwater discharges to and from its MS4. Within five years of the permit effective date, Halifax will evaluate identified town-owned properties. The evaluation will include:

1. The next planned infrastructure, resurfacing, or redevelopment activity planned for the property (if applicable) OR planned retrofit date;
2. The estimated cost of redevelopment or retrofit BMPs; and
3. The engineering and regulatory feasibility of redevelopment or retrofit BMPs.

Halifax will provide a listing of planned structural BMPs and a plan and schedule for implementation in the Year 5

Annual Report.

Halifax will track and estimate the nutrient removal for structural BMPs, consistent with MS4 permit Attachment 3 to Appendix F. Halifax will document in each Annual Report the BMP type, total area treated by the BMP, the design storage volume of the BMP, and the estimated nutrient removed in mass per year by the BMP.

Responsible Department/Parties:

- Highway Department
- External Contractor

Measurable Goal(s):

- Complete 4 years after effective date of permit and report annually on retrofitted properties
- Complete list of planned structural BMPs and implementation schedule within five years of permit effective date (by June 30, 2023) (in year 5 annual report)

BMP 5.05: Demonstration Project Installation

Description:

Halifax will plan and install a minimum of one structural BMP as a demonstration project within the drainage area of the water quality-limited waterbodies or their tributaries (West Monponsett Pond or its tributaries (impaired for Phosphorous) or Taunton River or its tributaries (impaired for Nitrogen)) within six years of the permit effective date. The demonstration project will be installed targeting a catchment with high nutrient load potential.

Halifax will identify additional town-owned sites and infrastructure that could be retrofitted such that Halifax maintains a minimum of 5 sites in their inventory; evaluate all town-owned properties identified as presenting retrofit opportunities or areas for structural BMP installation, identified in the Nutrient Source Identification Reports (BMP 6.10), that are within the drainage area of West Monponsett Pond (impaired for Phosphorous) or its tributaries and/or tributaries to the Taunton River (impaired for Nitrogen).

Responsible Department/Parties:

- Highway Department

Measurable Goal(s):

- Complete within 6 years of the effective date of the permit

MCM 6 Good Housekeeping and Pollution Prevention for Permittee Owned Operations

Permit Part 2.3.7

Objective

The objective of Halifax's Good Housekeeping program is to prevent or reduce pollutant runoff from Halifax facilities and operations.

Program Overview

The following table summarizes Good Housekeeping BMPs and schedule.

BMP	Schedule by Permit Year (Fiscal Year)				
	1 (FY19)	2 (FY20)	3 (FY21)	4 (FY22)	5 (FY23)
Permittee Owned Facilities					
6.01: Parks and Open Spaces Inventories and Operations and Maintenance Procedures		x	x	x	x
6.02: Buildings and Facilities Operations and Maintenance Procedures		x	x	x	x
6.03: Vehicles and Equipment Operations and Maintenance Procedures		x	x	x	x
Infrastructure					
6.04: Infrastructure Operations and Maintenance Procedures		x	x	x	x
6.05: Catch Basin Cleaning Program		x	x	x	x
6.06: Street Sweeping Program		x	x	x	x
6.07: Winter Road Maintenance Program		x	x	x	x
6.08: Stormwater Treatment Structures Inspection and Maintenance Procedures	x	x	x	x	x
6.09: SWPPP			x	x	x
6.10: Nutrient Source Identification Report				x	
6.11: Phosphorous Additional Requirements	x	x	x	x	x

PERMITTEE OWNED FACILITIES

BMP 6.01: Parks and Open Spaces Inventories and Operations and Maintenance Procedures

Description:

Halifax will create written Operations and Maintenance (O&M) procedures including all requirements contained in permit section 2.3.7.a.ii 1 for parks and open spaces owned by the Town. Procedures will address:

- The proper use, storage, and disposal of pesticides, herbicides, and fertilizers including minimizing the use of these products and using only in accordance manufacturer's instruction;
- Lawn maintenance and landscaping activities to ensure practices are protective of water quality;
- Pet waste handling collection and disposal at all parks and open space where pets are permitted, including the placing of proper signage concerning the proper collection and disposal of pet waste;
- Waterfowl congregation areas where appropriate to reduce waterfowl droppings from entering the MS4;
- Management of trash containers at parks and open space (scheduled cleanings; sufficient number); and
- Erosion or poor vegetative cover, especially within 50 feet of a surface water.

Responsible Department/Parties:

- Highway Department
- Parks Commission
- Conservation
- Town Administrator

Measurable Goal:

- Establish O&M procedures within 2 years of the effective date of the permit
- Implement the O&M procedures on 100% of the parks and open spaces

---

BMP 6.02: Buildings and Facilities Operations and Maintenance Procedures

Description:

Halifax will create written O&M procedures including all requirements contained in 2.3.7.a.ii 2 for buildings and facilities owned by the Town. Halifax will target buildings and facilities where pollutants are exposed to stormwater runoff and will develop procedures to address:

- The use, storage, and disposal of petroleum products and other potential stormwater pollutants; management of dumpsters and other waste management equipment;
- Maintenance of parking lots and areas surrounding the facilities to reduce runoff of pollutants; and
- Employee training.

Responsible Department/Parties:

- Highway Department
- Building Committee
- School Committee
- Town Administrator

Measurable Goal:

- Complete within 2 years of the effective date of permit
- Implement the O&M procedures on 100% of buildings and facilities

---

BMP 6.03: Vehicles and Equipment Operations and Maintenance Procedures

Description:

Halifax will create written O&M procedures including all requirements contained in 2.3.7.a.ii 3 for vehicles and equipment owned by the town. Halifax will establish procedures for the storage of vehicles, management of fueling areas, and the discharge of vehicle wash waters.

Responsible Department/Parties:

- Highway Department

Measurable Goal:

- Complete and implement within 2 years of the effective date of the permit
- Implement the O&M procedures on 100% of vehicles and equipment

INFRASTRUCTURE

BMP 6.04: Infrastructure Operations and Maintenance Procedures

Description:

Halifax will establish SOP and implement program for repair and rehabilitation of MS4 infrastructure so that the MS4 infrastructure is maintained in a timely manner to reduce the discharge of pollutants from the MS4. The infrastructure O&M procedures will include the catch basin cleaning program (BMP 6.05), street and parking lot sweeping program (BMP 6.06), winter road maintenance program (BMP 6.07), and stormwater treatment system inspection program (BMP 6.08).

Responsible Department/Parties:

- Highway Department

Measurable Goal(s):

- Complete within 2 years of the permit effective date

BMP 6.05: Catch Basin Cleaning Program

Description:

Halifax will establish schedule for catch basin cleaning such that each catch basin is no more than 50% full. Halifax will complete an optimization analysis to schedule routine inspections, cleaning, and maintenance of catch basins such that the following conditions are met:

- Prioritize inspection and maintenance for catch basins located near construction activities. Clean catch basins in such areas more frequently if inspection and maintenance activities indicate excessive sediment or debris loadings.
- Establish a schedule with a goal that the frequency of routine cleaning will ensure that no catch basin at any time will be more than 50 percent full.
- If a catch basin sump is more than 50 percent full during two consecutive routine inspections/cleaning events, document that finding, investigate the contributing drainage area for sources of excessive sediment loading, and to the extent practicable, abate contributing sources. Describe any actions taken in annual report.

The procedures will also identify proper storage of catch basin cleanings and street sweepings prior to disposal or reuse. Halifax will report in each annual report the total number of catch basins, number inspected, number cleaned, and the total volume or mass of material removed from all catch basins.

Responsible Department/Parties:

- Highway Department

Measurable Goal(s):

- Clean catch basins on established schedule and report number of catch basins cleaned and volume of material moved annually

BMP 6.06: Street Sweeping Program

Description:

Halifax will sweep all streets and town-owned parking lots a minimum of once in the Spring and once in the Fall, with the exception of rural uncurbed roads with no catch basins. Halifax will develop and implement an inspection, documentation, and targeted sweeping plan for rural uncurbed roadways with no catch basins and limited access highways. Halifax will also sweep more frequently in areas with land uses that generate higher sediment loading and/or where catch basin inspections indicate higher loading rates.

Responsible Department/Parties:

- Highway Department

Measurable Goal(s):

- Street Sweeping Program shall be implemented within 2 years of the effective date of the permit.
- Develop Street Sweeping Plan for Uncurbed Roads with no catch basins and limited access highways within 2 years of the effective date of the permit.
- Annually sweep 100% of all streets and municipal parking lots twice per year (once in the Spring and once in the Fall).

BMP 6.07: Winter Road Maintenance Program

Description:

Halifax will establish and implement written procedures for winter road maintenance, including the use and storage of salt and sand and opportunities to use alternative materials. The procedures will also ensure that snow disposal activities do not result in disposal of snow into waters of the United States.

Responsible Department/Parties:

- Highway Department

Measurable Goal(s):

- Implement salt use optimization during deicing season
- Evaluate the use of at least one salt/chloride alternative

BMP 6.08: Stormwater Treatment Structures Inspection and Maintenance Procedures

Description:

Halifax will establish and implement inspection and maintenance procedures and frequencies of stormwater treatment structures such as water quality swales, detention basins, infiltration structures, and proprietary treatment devices. Halifax will inspect all town-owned stormwater treatment units (excluding catch basins) annually at a minimum.

Responsible Department/Parties:

- Highway Department

Measurable Goal(s):

- Inspect and maintain 100% of treatment structures to ensure proper function

---

BMP 6.09: SWPPP

Description:

Halifax will create SWPPPs for the Town's 60 Hemlock Lane maintenance facility and 917 Plymouth Street recycling facility. The SWPPPs will include the following elements:

- Pollution prevention team
- Description of the facility and identification of potential pollutant sources
- Identification of stormwater controls
- Management practices to minimize or prevent exposure and clean exposed areas
- Preventative maintenance
- Spill prevention and response
- Erosion and sediment control
- Management of runoff
- Enclosure of salt storage piles or piles containing salt
- Employee training
- Maintenance of control measures
- Site inspections schedule and documentation

Halifax will develop the SWPPPs by the end of permit Year 2 and will maintain all records associated with the SWPPP. Employees will be trained annually on the contents and procedures of the SWPPPs.

Responsible Department/Parties:

- Highway Department
- Water Board

Measurable Goal(s):

- Annually train employees on SWPPP
- Complete and implement within 2 years of permit effective date

---

BMP 6.10: Nutrient Source Identification Report

Description:

For catchments discharging to nutrient-impaired waterbodies and their tributaries (West Monponsett Pond for Phosphorous and Taunton River for Nitrogen), Halifax will develop a nutrient source identification report. Halifax will develop the report within four years of the permit effective date (by June 30, 2022), and will submit the Report as part of Halifax's Year 4 Annual Report.

The nutrient (Phosphorous and Nitrogen) source identification report will include the following elements:

1. Calculation of total MS4 area draining to the water quality limited water segments or their tributaries incorporating updated mapping of the MS4 and catchment delineations produced pursuant to part 2.3.4.6,
2. All screening and monitoring results pursuant to part 2.3.4.7.d., targeting the receiving water segment(s)
3. Impervious area and directly connected impervious area (DCIA) for the target catchment
4. Identification, delineation and prioritization of potential catchments with high nutrient loading
5. Identification of potential retrofit opportunities or opportunities for the installation of structural BMPs during redevelopment

Reports will include the information required in Appendix H of the permit, Part I.1.b.i for Nitrogen and Part II.1.b.i for Phosphorous.

Responsible Department/Parties:

- External Contractor
- Town Administrator
- Highway Department

Measurable Goal(s):

- Complete within four years of permit effective date (Submitted to EPA as part of the Year 4 Annual Report)

BMP 6.11: Nutrients Additional Requirements

Description:

Per Appendix H of the permit, Halifax will manage grass clippings and leaf litter, prohibit blowing organic waste material onto impervious surfaces, and establish requirements for use of slow release fertilizers and reducing fertilizer use in watersheds of waterbodies impaired for nutrients, West Monponsett Pond for Phosphorous and tributaries to the Taunton River for Nitrogen.

Responsible Department/Parties:

- Board of Health

Measurable Goal(s):

- Monitor and enforce these requirements annually

Surface Public Drinking Water Supply Protection

Permit Part 3.0

The MS4 Permit Part 3.0 requires permittees to implement additional measures for discharges to surface drinking water supplies and their tributaries. Halifax will prioritize discharges to public surface drinking water supply sources (Class A and Class B surface waters used for drinking water) or their tributaries in implementation of this SWMP. Halifax falls within the watershed of Silver Lake, the drinking water source for Brockton, MA.

Applicable Waterbodies

Silver Lake

Enhanced BMPs

Halifax will implement the following measures to avoid or minimize impacts to surface public drinking water supply sources.

BMP 7.01 Pretreatment for Septic Systems

Description:
Halifax will continue to require pretreatment for septic systems located in the watershed of Silver Lake.

Responsible Department/Parties:
- Board of Health

Measurable Goal(s):
- Number of septic systems conducting pretreatment

BMP 7.02 Zoning Districts

Description:
Halifax will continue to enforce its zoning to protect drinking water sources, through the Conservancy District and Floodplain District. The Conservancy District is intended "to protect the town's wetlands, floodplains and bogs while allowing appropriate development. The district allows most public/institutional and agricultural uses as of right while requiring special permits for housing and major institutions and prohibiting most business and commercial recreation uses. " The Floodplain District is intended "to preserve and protect the streams and other watercourses of the town and their adjoining lands; to protect the health and safety of persons and property against the hazards of flooding; to protect the community against the detrimental use and development of lands adjoining such watercourses; and to conserve the watershed areas of the town for the health, safety and welfare of the public. The Floodplain District is an overlay district superimposed over other districts shown on the Zoning Map as a recognition of the special hazard which exists in such areas."

Responsible Department/Parties:
- Planning Board

Measurable Goal(s):
- Number of projects reviewed in Conservancy Districts and Floodplain Districts

The following enhanced BMPs described in MCMs 1-6 also have particular relevance to drinking water supply protection:

Enhanced BMP for Surface Water Supply Protection
1.01: Spring Educational Message 1.02: Summer Educational Message 1.03: Fall Educational Message 1.04: Residential and Commercial Educational Messages 1.05: Industrial Facility Educational Messages 1.06: Developer (construction) Educational Messages
2.02: Water Quality Data Posting
2.05: Partnership with Monponsett Watershed Association

TMDLs and Water Quality Limited Waters

Permit Part 2.2

The MS4 permit Part 2.2 describes additional requirements for MS4s that discharge to waters that are subject to Total Maximum Daily Loads (TMDLs) and/or that discharge to certain water quality limited waters. None of Halifax's waterbodies are subject to approved TMDL(s), although there is a draft TMDL for Phosphorous for West and East Monponsett Pond(s). Because this TMDL was not finalized before the date of issuance of the 2016 MS4 permit, Halifax is exempt from the requirements in the permit Appendix F: Requirements for Discharges to Impaired Waters with an Approved TMDL and will comply with the requirements within Appendix H.

Halifax's facilities discharge to the waterbodies in watersheds of the following impaired waterbodies without approved TMDLs:

Waterbody	**Impairment**
West Monponsett Pond	Phosphorous
Taunton River	Nitrogen

Specific requirements for these waterbodies are detailed in the MS4 permit Appendix H: Requirements Related to Discharges to Certain Water Quality Limited Waterbodies.

Enhanced BMPs

The following table summarizes the Enhanced BMPs, as described in the SWMP above, that Halifax will implement to meet MS4 Permit Appendix H requirements for discharge to phosphorus-impaired waterbodies and their tributaries (West Monponsett Pond) and tributaries to nitrogen-impaired waterbodies (Taunton River).

Requirements	Enhanced BMPs
Distribute an annual message in the spring (April/May) that encourages the proper use and disposal of grass clippings and encourages the proper use of slow-release and phosphorus-free fertilizers	BMP 1.01: Spring Educational Message will cover this topic.
Distribute an annual message in the summer (June/July) encouraging the proper management of pet waste	BMP 1.02: Summer Educational Message will cover this topic.
Distribute an annual message in the fall (August/September/October) encouraging the proper disposal of leaf litter	BMP 1.03: Fall Educational Message will cover this topic.
For post-development stormwater management, include a requirement that new development and redevelopment stormwater management BMPs be optimized for [nutrient (phosphorous or nitrogen)] removal	BMP 5.01: Post Construction Bylaw will include optimized structural BMP requirements.

Requirements	Enhanced BMPs
For retrofit inventory and priority ranking, include consideration of BMPs to reduce nutrient discharges	BMP 5.04: List of Municipal Retrofit Opportunities • Halifax will evaluate all town-owned properties identified as presenting retrofit opportunities or areas for structural BMP installation, identified in the Nutrient Source Identification Reports (BMP 6.10), that are within the drainage area of West Monponsett Pond or its tributaries or tributaries to Taunton River.
Establish procedures to properly manage grass cuttings and leaf litter on permittee property, including prohibiting blowing organic waste materials onto adjacent impervious surfaces	BMP 6.11: Nutrients Additional Requirements will cover this topic. • O&M Procedures (BMP 6.04) will detail measures to address water quality impairments, including landscape maintenance to reduce nutrient loading to impaired waterbodies
Increase street sweeping frequency of all municipal owned streets and parking lots subject to permit part 2.3.7.a.iii.(c) to a minimum of two times per year (spring and fall)	BMP 6.06: Street Sweeping Program • Halifax will sweep all streets and town-owned parking lots two times per year (spring and fall).
Within four years of the permit effective date the permittee shall complete a [Nutrient (Nitrogen and Phosphorous)] Source Identification Report	BMP 6.10: Nutrient Source Identification Report

Annual Evaluation

This section will be updated annually as annual reports are completed.

Year 1 Annual Report

Document Name and/or Web Address:

Year 2 Annual Report

Document Name and/or Web Address:

Year 3 Annual Report

Document Name and/or Web Address:

Year 4 Annual Report

Document Name and/or Web Address:

Year 5 Annual Report

Document Name and/or Web Address:

Appendix A

Halifax IDDE Plan

Town of Halifax

Illicit Discharge Detection and Elimination (IDDE) Plan

June 30, 2019

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Halifax

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1 Introduction

1.1 MS4 Program

This Illicit Discharge Detection and Elimination (IDDE) Plan has been developed by Halifax to address the requirements of the United States Environmental Protection Agency's (USEPA's) 2016 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts, hereafter referred to as the "2016 Massachusetts MS4 Permit" or "MS4 Permit."

The 2016 Massachusetts MS4 Permit requires that each permittee, or regulated community, address six Minimum Control Measures. These measures include the following:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination Program
4. Construction Site Stormwater Runoff Control
5. Stormwater Management in New Development and Redevelopment (Post Construction Stormwater Management); and
6. Good Housekeeping and Pollution Prevention for Permittee Owned Operations.

Under Minimum Control Measure 3, the permittee is required to implement an IDDE program to systematically find and eliminate sources of non-stormwater discharges to its municipal separate storm sewer system and implement procedures to prevent such discharges. The IDDE program must also be recorded in a written (hardcopy or electronic) document. This IDDE Plan has been prepared to address this requirement.

1.2 Illicit Discharges

An "illicit discharge" is any discharge to a drainage system that is not composed entirely of stormwater, with the exception of discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the MS4) and discharges resulting from fire-fighting activities.

Illicit discharges may take a variety of forms. Illicit discharges may enter the drainage system through direct or indirect connections. Direct connections may be relatively obvious, such as cross-connections of sewer services to the storm drain system. Indirect illicit discharges may be more difficult to detect or address, such as failing septic systems that discharge untreated sewage to a ditch within the MS4, or a sump pump that discharges contaminated water on an intermittent basis.

Some illicit discharges are intentional, such as dumping used oil (or other pollutant) into catch basins, a resident or contractor illegally tapping a new sewer lateral into a storm drain pipe to avoid the costs of a sewer connection fee and service, and illegal dumping of yard wastes into surface waters.
Some illicit discharges are related to the unsuitability of original infrastructure to the modern regulatory environment. Examples of illicit discharges in this category include connected floor drains in old buildings, as well as sanitary sewer overflows that enter the drainage system. Sump pumps legally connected to the storm drain system may be used inappropriately, such as for the disposal of floor

washwater or old household products, in many cases due to a lack of understanding on the part of the homeowner.

Elimination of some discharges may require substantial costs and efforts, such as funding and designing a project to reconnect sanitary sewer laterals. Others, such as improving self-policing of dog waste management, can be accomplished by outreach in conjunction with the minimal additional cost of dog waste bins and the municipal commitment to disposal of collected materials on a regular basis.

Regardless of the intention, when not addressed, illicit discharges can contribute high levels of pollutants, such as heavy metals, toxics, oil, grease, solvents, nutrients, and pathogens to surface waters.

1.3 Allowable Non-Stormwater Discharges

The following categories of non-storm water discharges are allowed under the MS4 Permit unless the permittee, USEPA or Massachusetts Department of Environmental Protection (MassDEP) identifies any category or individual discharge of non-stormwater discharge as a significant contributor of pollutants to the MS4:

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground water
- Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20))
- Uncontaminated pumped groundwater
- Discharge from potable water sources
- Foundation drains
- Air conditioning condensation
- Irrigation water, springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual resident car washing
- De-chlorinated swimming pool discharges
- Street wash waters
- Residential building wash waters without detergents

If these discharges are identified as significant contributors to the MS4, they must be considered an "illicit discharge" and addressed in the IDDE Plan (i.e., control these sources so they are no longer significant contributors of pollutants, and/or eliminate them entirely).

1.4 Receiving Waters and Impairments

Table 1-1 lists the "impaired waters" within the boundaries of Halifax's regulated area based on the 2014 Massachusetts Integrated List of Waters produced by MassDEP every two years. Impaired waters are water bodies that do not meet water quality standards for one or more designated use(s) such as recreation or aquatic habitat.

Table 1-1. Impaired Waters

Halifax

Water Body Name	Segment ID	Category	Impairment(s)	Associated Approved TMDL
West Monponsett Pond	MA62119	5	Excess Algal Growth, Total Phosphorus, and Secchi Disk Transparency	N/A
East Monponsett Pond	MA62218	4A	Mercury in Fish Tissue	N/A
Silver Lake	MA94143	4C	Other flow regime alterations	N/A

Category 4a Waters – impaired water bodies with a completed Total Maximum Daily Load (TMDL).
Category 4c Waters – impaired water bodies where the impairment is not caused by a pollutant. No TMDL required.
Category 5 Waters – impaired water bodies that require a TMDL.
"Approved TMDLs" are those that have been approved by EPA as of the date of issuance of the 2016 MS4 Permit.

1.5 IDDE Program Goals, Framework, and Timeline

The goals of the IDDE program are to find and eliminate illicit discharges to municipal separate storm sewer system and to prevent illicit discharges from happening in the future. The program consists of the following major components as outlined in the MS4 Permit:

- Legal authority and regulatory mechanism to prohibit illicit discharges and enforce this prohibition
- Storm system mapping
- Inventory and ranking of outfalls
- Dry weather outfall screening
- Catchment investigations
- Identification/confirmation of illicit sources
- Illicit discharge removal
- Followup screening
- Employee training.

The IDDE investigation procedure framework is shown in **Figure 1-1.** The required timeline for implementing the IDDE program is shown in **Table 1-2**.

Figure 1-1. IDDE Investigation Procedure Framework

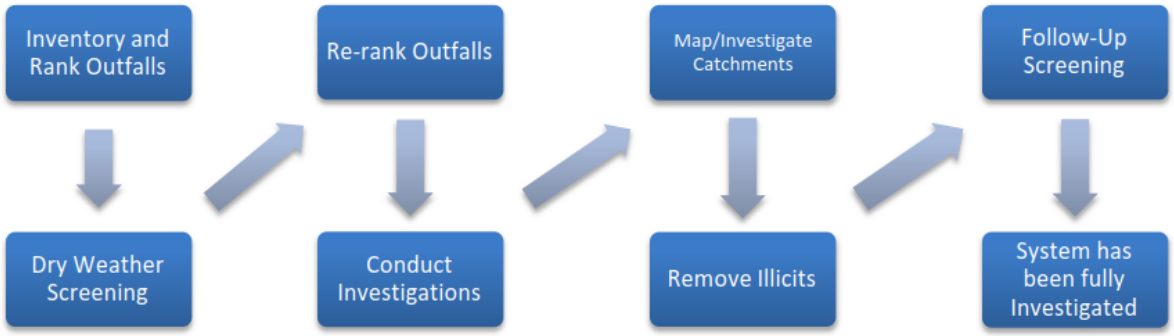

Table 1-2. IDDE Program Implementation Timeline

IDDE Program Requirement	Completion Date from Effective Date of Permit					
	1 Year	1.5 Years	2 Years	3 Years	7 Years	10 Years
Written IDDE Program Plan	X					
SSO Inventory	X					
Written Catchment Investigation Procedure		X				
Phase I Mapping			X			
Phase II Mapping						X
IDDE Regulatory Mechanism or By-law (if not already in place)				X		
Dry Weather Outfall Screening				X		
Follow-up Ranking of Outfalls and Interconnections				X		
Catchment Investigations – Problem Outfalls					X	
Catchment Investigations – all Problem, High and Low Priority Outfalls						X

1.6 Work Completed to Date

The 2003 MS4 Permit required each MS4 community to develop a plan to detect illicit discharges using a combination of storm system mapping, adopting a regulatory mechanism to prohibit illicit discharges and enforce this prohibition, and identifying tools and methods to investigate suspected illicit discharges. Each MS4 community was also required to define how confirmed discharges would be eliminated and how the removal would be documented.

Halifax has completed the following IDDE program activities prior to the 2016 MS4 Permit term:

- Mapped outfalls and receiving waters town-wide
- Mapped catch basins, pipes, manhole junctions, culverts, and overflows for much of the town
- Delineated catchment areas for areas draining to East and West Monponsett Pond
- Conducted dry weather outfall screening at 30 outfalls discharging to East and West Monponsett Pond
- Inspected East and West Monponsett Pond watershed for sanitary sewer overflows (SSOs)

2 Authority and Statement of IDDE Responsibilities

2.1 Legal Authority

Halifax will adopt a bylaw, to provide Halifax with adequate legal authority to:

- Prohibit illicit discharges
- Investigate suspected illicit discharges
- Eliminate illicit discharges, including discharges from properties not owned by or controlled by the MS4 that discharge into the MS4 system
- Implement appropriate enforcement procedures and actions.

The bylaw, ordinance, or other regulatory mechanism will meet the requirements of the 2016 MS4 Permit and will be in place by July 1, 2020.

2.2 Statement of Responsibilities

The IDDE bylaw to be adopted will outline which department is responsible for implementing the IDDE program and enforcement. This section of the IDDE Plan will be updated once the bylaw has been finalized and responsibilities have been assigned.

3 Stormwater System Mapping

Halifax originally developed mapping of its stormwater system to meet the mapping requirements of the 2003 MS4 Permit. The existing storm system map is available online at this link: http://ocpcrpa.maps.arcgis.com/apps/webappviewer/index.html?id=4d60e6cf4c8c4efea4b83472a0424be5.
The existing storm system map contains much of the additional infrastructure required under the 2016 MS4 Permit, and Halifax will continue to refine the storm system map to facilitate the identification of key infrastructure, factors influencing proper system operation, and the potential for illicit discharges.

The 2016 MS4 Permit requires the storm system map to be updated in two phases as outlined below. The Highway Department is responsible for updating the stormwater system mapping pursuant to the 2016 MS4 Permit. Halifax will report on the progress towards completion of the storm system map in each annual report. Updates to the stormwater mapping will be included in the online map.

3.1 Phase I Mapping

Phase I mapping must be completed within two (2) years of the effective date of the permit (July 1, 2019) and include the following information:

- Outfalls and receiving waters (previously required by the MS4-2003 permit)

- Open channel conveyances (swales, ditches, etc.)
- Interconnections with other MS4s and other storm sewer systems
- Municipally owned stormwater treatment structures
- Water bodies identified by name and indication of all use impairments as identified on the most recent EPA approved Massachusetts Integrated List of Waters report
- Initial catchment delineations. Topographic contours and drainage system information may be used to produce initial catchment delineations.

Halifax will update its stormwater mapping by July 1, 2020 to include the remaining Phase I information.

3.2 Phase II Mapping

Phase II mapping must be completed within ten (10) years of the effective date of the permit (July 1, 2028) and include the following information:

- Outfall spatial location (latitude and longitude with a minimum accuracy of +/-30 feet)
- Pipes
- Manholes
- Catch basins
- Refined catchment delineations. Catchment delineations must be updated to reflect information collected during catchment investigations.

Halifax will update its stormwater mapping by July 1, 2028 to include the remaining following Phase II information.

4 Sanitary Sewer Overflows (SSOs)

The 2016 MS4 Permit requires municipalities to prohibit illicit discharges, including sanitary sewer overflows (SSOs), to the separate storm sewer system. SSOs are discharges of untreated sanitary wastewater from a municipal sanitary sewer that can contaminate surface waters, cause serious water quality problems and property damage, and threaten public health. SSOs can be caused by blockages, line breaks, sewer defects that allow stormwater and groundwater to overload the system, power failures, improper sewer design, and vandalism.

Within the five (5) years prior to the effective date of the 2016 MS4 Permit, Halifax did not identify any SSOs that have discharged to the MS4 based on review of available documentation pertaining to SSOs and field investigations. There are no sanitary sewers in Halifax, and septic systems are inspected on a schedule set by the Board of Health.

Upon detection of an SSO, Halifax will eliminate it as expeditiously as possible and take interim measures to minimize the discharge of pollutants to and from its MS4 until the SSO is eliminated. Upon becoming aware of an SSO to the MS4, Halifax will provide oral notice to EPA within 24 hours and written notice to EPA, and MassDEP within five (5) days of becoming aware of the SSO occurrence.

The Highway Department and Board of Health will update the SSO inventory in this Plan when new SSOs are detected. The SSO inventory will be included in the annual report, including the status of mitigation and corrective measures to address each identified SSO.

5 Assessment and Priority Ranking of Outfalls

The 2016 MS4 Permit requires an assessment and priority ranking of outfalls in terms of their potential to have illicit discharges and SSOs and the related public health significance. The ranking helps determine the priority order for performing IDDE investigations and meeting permit milestones.

5.1 Outfall Catchment Delineations

A catchment is the area that drains to an individual outfall[1] or interconnection.[2] The catchments for each of the MS4 outfalls will be delineated to define contributing areas for investigation of potential sources of illicit discharges. Catchments are typically delineated based on topographic contours and mapped drainage infrastructure, where available. As described in **Section 3**, initial catchment delineations will be completed as part of the Phase I mapping, and refined catchment delineations will be completed as part of the Phase II mapping to reflect information collected during catchment investigations.

5.2 Outfall and Interconnection Inventory and Initial Ranking

The Highway Department will complete an initial outfall and interconnection inventory and priority ranking to assess illicit discharge potential based on existing information. The initial inventory and ranking will be completed within one (1) year from the effective date of the permit. An updated inventory and ranking will be provided in each annual report thereafter. The inventory will be updated annually to include data collected in connection with dry weather screening and other relevant inspections.

The outfall and interconnection inventory will identify each outfall and interconnection discharging from the MS4, record its location and condition, and provide a framework for tracking inspections, screenings and other IDDE program activities.

Outfalls and interconnections will be classified into one of the following categories:

1. **Problem Outfalls**: Outfalls/interconnections with known or suspected contributions of illicit discharges based on existing information shall be designated as Problem Outfalls. This shall include any outfalls/interconnections where previous screening indicates likely sewer input. Likely sewer input indicators are any of the following:

[1] **Outfall** means a point source as defined by 40 CFR § 122.2 as the point where the municipal separate storm sewer discharges to waters of the United States. An outfall does not include open conveyances connecting two municipal separate storm sewers or pipes, tunnels or other conveyances that connect segments of the same stream or other waters of the United States and that are used to convey waters of the United States. Culverts longer than a simple road crossing shall be included in the inventory unless the permittee can confirm that they are free of any connections and simply convey waters of the United States.

[2] **Interconnection** means the point (excluding sheet flow over impervious surfaces) where the permittee's MS4 discharges to another MS4 or other storm sewer system, through which the discharge is conveyed to waters of the United States or to another storm sewer system and eventually to a water of the United States.

- Olfactory or visual evidence of sewage,
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

Dry weather screening and sampling, as described in **Section 6** of this IDDE Plan and Part 2.3.4.7.b of the MS4 Permit, is not required for Problem Outfalls.

2. **High Priority Outfalls**: Outfalls/interconnections that have not been classified as Problem Outfalls and that are:

    - Discharging to an area of concern to public health due to proximity of public beaches, recreational areas, drinking water supplies or shellfish beds
    - Determined by the permittee as high priority based on the characteristics listed below or other available information.

3. **Low Priority Outfalls**: Outfalls/interconnections determined by the permittee as low priority based on the characteristics listed below or other available information.

4. **Excluded outfalls**: Outfalls/interconnections with no potential for illicit discharges may be excluded from the IDDE program. This category is limited to roadway drainage in undeveloped areas with no dwellings and no sanitary sewers; drainage for athletic fields, parks or undeveloped green space and associated parking without services; cross-country drainage alignments (that neither cross nor are in proximity to sanitary sewer alignments) through undeveloped land.

Outfalls will be ranked into the above priority categories (except for excluded outfalls, which may be excluded from the IDDE program) based on the following characteristics of the defined initial catchment areas, where information is available. Additional relevant characteristics, including location-specific characteristics, may be considered but must be documented in this IDDE Plan.

- **Past discharge complaints, reports, and screening results.**

- **Discharging to Area of Concern to Public Health** – outfalls or interconnections that discharge to public beaches, recreational areas, drinking water supplies and/or shellfish beds

- **Impaired Waterbodies –** discharges to waters impaired for bacteria according to the most recent 303(d) list.

- **TMDL Watershed** – discharges to waters with an approved TMDL where illicit discharges may contribute to the pollutant of concern.

- **Density of generating sites within Catchment** – Generating sites are those places, including institutional, municipal, commercial, or industrial sites, with a potential to generate pollutants that could contribute to illicit discharges, based on land use codes or local knowledge.

Table 5-1 provides the Halifax outfall inventory and priority ranking.

Table 5-1. Outfall Inventory and Priority Ranking Matrix

Halifax, Massachusetts
Revision Date: 6/27/2019

Outfall ID	Receiving Water		Reports or Complaints of Potential Illicit Discharges?[1]	Discharging to Area of Concern to Public Health?[2]				Receiving Water Quality [3]	TMDL Watershed[4]	Density of Generating Sites within Catchment[5]	Score	Priority Ranking
Information Source			Town/Agency Records	a	b	c	d	Impaired Waters List	MassDEP	Land Use/GIS Maps		
Scoring Criteria			Yes = 40 (Problem Outfall) No = 0	Yes = 6 No = 0				Bacteria = 6 Other = 2 None = 0	Yes = 2 No = 0	High = 3 Medium = 2 Low = 0		Problem = ≥40 High Priority = ≥6 Low Priority = <6
OW-10	MA62119	Monponsett Pond (West)	0	0	6	6	0	2	2	0	16	High Priority
OW-18	MA62119	Monponsett Pond (West)	0	0	0	6	0	2	2	3	13	High Priority
OE-6	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	2	12	High Priority
OW-3	MA62119	Monponsett Pond (West)	0	0	0	6	0	2	2	2	12	High Priority
OW-4	MA62119	Monponsett Pond (West)	0	0	0	6	0	2	2	2	12	High Priority
OE-25	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	2	12	High Priority
OE-15	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	2	12	High Priority
OE-14	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	2	12	High Priority
OE-8	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	2	12	High Priority
OE-32	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	2	12	High Priority
OE-23	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	2	12	High Priority
OW-16	MA62119	Monponsett Pond (West)	0	0	0	6	0	2	2	2	12	High Priority
OW-17	MA62119	Monponsett Pond (West)	0	0	0	6	0	2	2	2	12	High Priority
OW-2	MA62119	Monponsett Pond (West)	0	0	0	6	0	2	2	2	12	High Priority
OW-1	MA62119	Monponsett Pond (West)	0	0	0	6	0	2	2	2	12	High Priority
OSL-06	MA94143	Silver Lake	0	0	0	6	0	2	2	2	12	High Priority
OSL-02	MA94143	Silver Lake	0	0	0	6	0	2	2	2	12	High Priority
OSL-10	MA94143	Silver Lake	0	0	0	6	0	2	2	2	12	High Priority
OE-19	MA62218	Monponsett Pond (East)	0	0	0	6	0	0	2	2	10	High Priority
OE-03	MA62218	Monponsett Pond (East)	0	0	0	6	0	0	2	2	10	High Priority
OSL-01	MA94143	Silver Lake	0	0	0	6	0	2	2	0	10	High Priority
OE-21	MA62218	Monponsett Pond (East)	0	0	0	6	0	0	2	2	10	High Priority
OE-20	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	0	10	High Priority
OE-11	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	0	10	High Priority
OE-9	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	0	10	High Priority
OE-10	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	0	10	High Priority
OE-31	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	0	10	High Priority
OE-24	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	0	10	High Priority
OE-22	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	0	10	High Priority
OE-7	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	0	10	High Priority

Outfall ID	Receiving Water		Reports or Complaints of Potential Illicit Discharges?[1]	Discharging to Area of Concern to Public Health?[2]				Receiving Water Quality [3]	TMDL Watershed[4]	Density of Generating Sites within Catchment[5]	Score	Priority Ranking
Information Source			Town/Agency Records	a	b	c	d	Impaired Waters List	MassDEP	Land Use/GIS Maps		
Scoring Criteria			Yes = 40 (Problem Outfall) No = 0	Yes = 6 No = 0				Bacteria = 6 Other = 2 None = 0	Yes = 2 No = 0	High = 3 Medium = 2 Low = 0		Problem = ≥40 High Priority = ≥6 Low Priority = <6
OE-12	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	0	10	High Priority
OE-16	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	0	10	High Priority
OE-18	MA62118	Monponsett Pond (East)	0	0	0	6	0	2	2	0	10	High Priority
OE-5	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	0	10	High Priority
OE-2	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	0	10	High Priority
OE-4	MA62218	Monponsett Pond (East)	0	0	0	6	0	2	2	0	10	High Priority
OW-6	MA62119	Monponsett Pond (West)	0	0	0	6	0	2	2	0	10	High Priority
OW-7	MA62119	Monponsett Pond (West)	0	0	0	6	0	2	2	0	10	High Priority
OSL-08	MA94143	Silver Lake	0	0	0	6	0	0	2	0	8	High Priority
OSL-07	MA94143	Silver Lake	0	0	0	6	0	0	2	0	8	High Priority
OSL-11	MA94143	Silver Lake	0	0	0	6	0	0	2	0	8	High Priority
OSL-09	MA94143	Silver Lake	0	0	0	6	0	0	2	0	8	High Priority
OSL-05	MA94143	Silver Lake	0	0	0	6	0	0	2	0	8	High Priority
OSL-04	MA94143	Silver Lake	0	0	0	6	0	0	2	0	8	High Priority
OSL-03	MA94143	Silver Lake	0	0	0	6	0	0	2	0	8	High Priority
OWR-16	MA62-24	Winnetuxet River	0	0	6	0	0	0	2	0	8	High Priority
OE-1	MA62218	Monponsett Pond (East)	0	0	0	6	0	0	2	0	8	High Priority
OE-17	MA62218	Monponsett Pond (East)	0	0	0	6	0	0	2	0	8	High Priority
OE-13	MA62218	Monponsett Pond (East)	0	0	0	6	0	0	2	0	8	High Priority
OW-8	MA62119	Monponsett Pond (West)	0	0	0	6	0	0	2	0	8	High Priority
OW-9	MA62119	Monponsett Pond (West)	0	0	0	6	0	0	2	0	8	High Priority
OW-5	MA62119	Monponsett Pond (West)	0	0	0	6	0	0	2	0	8	High Priority
OPSP-15	MA62141	Plymouth Street Pond	0	0	0	0	0	2	2	2	6	High Priority
OPSP-11	MA62141	Plymouth Street Pond	0	0	0	0	0	2	2	2	6	High Priority
OPSP-12	MA62141	Plymouth Street Pond	0	0	0	0	0	2	2	2	6	High Priority
OPSP-16	MA62141	Plymouth Street Pond	0	0	0	0	0	2	2	2	6	High Priority
OPSP-17	MA62141	Plymouth Street Pond	0	0	0	0	0	2	2	2	6	High Priority
OWR-15	MA62-24	Winnetuxet River	0	0	0	0	0	2	2	2	6	High Priority
OE-27	MA62218	Monponsett Pond (East)	0	0	0	0	0	0	2	3	5	Low Priority
OE-28	MA62218	Monponsett Pond (East)	0	0	0	0	0	0	2	3	5	Low Priority
OT-02	MA62-01	Taunton River	0	0	0	0	0	0	2	3	5	Low Priority
OESP-02	MA62066	Elm Street Pond	0	0	0	0	0	0	2	3	5	Low Priority
OE-30	MA62218	Monponsett Pond (East)	0	0	0	0	0	0	2	2	4	Low Priority
OPSP-08	MA62141	Plymouth Street Pond	0	0	0	0	0	0	2	2	4	Low Priority

Outfall ID	Receiving Water		Reports or Complaints of Potential Illicit Discharges?[1]	Discharging to Area of Concern to Public Health?[2]				Receiving Water Quality [3]	TMDL Watershed[4]	Density of Generating Sites within Catchment[5]	Score	Priority Ranking
Information Source			Town/Agency Records	a	b	c	d	Impaired Waters List	MassDEP	Land Use/GIS Maps		
Scoring Criteria			Yes = 40 (Problem Outfall) No = 0	Yes = 6 No = 0				Bacteria = 6 Other = 2 None = 0	Yes = 2 No = 0	High = 3 Medium = 2 Low = 0		Problem = ≥40 High Priority = ≥6 Low Priority = <6
OT-04	MA62-01	Taunton River	0	0	0	0	0	0	2	2	4	Low Priority
OW-14	MA62119	Monponsett Pond (West)	0	0	0	0	0	0	2	2	4	Low Priority
OPSP-18	MA62141	Plymouth Street Pond	0	0	0	0	0	2	2	0	4	Low Priority
OPSP-13	MA62141	Plymouth Street Pond	0	0	0	0	0	2	2	0	4	Low Priority
OWR-17	MA62-24	Winnetuxet River	0	0	0	0	0	2	2	0	4	Low Priority
OW-11	MA62119	Monponsett Pond (West)	0	0	0	0	0	0	2	2	4	Low Priority
OPSP-21	MA62141	Plymouth Street Pond	0	0	0	0	0	0	2	2	4	Low Priority
OWR-21	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	2	4	Low Priority
OWR-08	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	2	4	Low Priority
OWR-10	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	2	4	Low Priority
OWR-06	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	2	4	Low Priority
OWR-11	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	2	4	Low Priority
OWR-05	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	2	4	Low Priority
OWR-09	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	2	4	Low Priority
OE-29	MA62218	Monponsett Pond (East)	0	0	0	0	0	2	2	0	4	Low Priority
OW-15	MA62119	Monponsett Pond (West)	0	0	0	0	0	0	2	2	4	Low Priority
OW-23	MA62119	Monponsett Pond (West)	0	0	0	0	0	0	2	2	4	Low Priority
OESP-01	MA62066	Elm Street Pond	0	0	0	0	0	0	2	0	2	Low Priority
OPSP-04	MA62141	Plymouth Street Pond	0	0	0	0	0	0	2	0	2	Low Priority
OPSP-06	MA62141	Plymouth Street Pond	0	0	0	0	0	0	2	0	2	Low Priority
OPSP-07	MA62141	Plymouth Street Pond	0	0	0	0	0	0	2	0	2	Low Priority
OPSP-14	MA62141	Plymouth Street Pond	0	0	0	0	0	0	2	0	2	Low Priority
OPSP-05	MA62141	Plymouth Street Pond	0	0	0	0	0	0	2	0	2	Low Priority
OPSP-02	MA62141	Plymouth Street Pond	0	0	0	0	0	0	2	0	2	Low Priority
OPSP-01	MA62141	Plymouth Street Pond	0	0	0	0	0	0	2	0	2	Low Priority
OPSP-20	MA62141	Plymouth Street Pond	0	0	0	0	0	0	2	0	2	Low Priority
OPSP-19	MA62141	Plymouth Street Pond	0	0	0	0	0	0	2	0	2	Low Priority
OPSP-09	MA62141	Plymouth Street Pond	0	0	0	0	0	0	2	0	2	Low Priority
OPSP-10	MA62141	Plymouth Street Pond	0	0	0	0	0	0	2	0	2	Low Priority
OT-01	MA62-01	Taunton River	0	0	0	0	0	0	2	0	2	Low Priority
OT-03	MA62-01	Taunton River	0	0	0	0	0	0	2	0	2	Low Priority
OT-05	MA62-01	Taunton River	0	0	0	0	0	0	2	0	2	Low Priority
OE-26	MA62218	Monponsett Pond (East)	0	0	0	0	0	0	2	0	2	Low Priority
OW-13	MA62119	Monponsett Pond (West)	0	0	0	0	0	0	2	0	2	Low Priority

Outfall ID	Receiving Water		Reports or Complaints of Potential Illicit Discharges?[1]	Discharging to Area of Concern to Public Health?[2]				Receiving Water Quality [3]	TMDL Watershed[4]	Density of Generating Sites within Catchment[5]	Score	Priority Ranking
Information Source			Town/Agency Records	a	b	c	d	Impaired Waters List	MassDEP	Land Use/GIS Maps		
Scoring Criteria			Yes = 40 (Problem Outfall) No = 0	Yes = 6 No = 0				Bacteria = 6 Other = 2 None = 0	Yes = 2 No = 0	High = 3 Medium = 2 Low = 0		Problem = ≥40 High Priority = ≥6 Low Priority = <6
OW-12	MA62119	Monponsett Pond (West)	0	0	0	0	0	0	2	0	2	Low Priority
OW-21	MA62119	Monponsett Pond (West)	0	0	0	0	0	0	2	0	2	Low Priority
OPSP-22	MA62141	Plymouth Street Pond	0	0	0	0	0	0	2	0	2	Low Priority
OPSP-03	MA62141	Plymouth Street Pond	0	0	0	0	0	0	2	0	2	Low Priority
OWR-18	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	0	2	Low Priority
OWR-12	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	0	2	Low Priority
OWR-13	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	0	2	Low Priority
OWR-07	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	0	2	Low Priority
OWR-01	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	0	2	Low Priority
OWR-04	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	0	2	Low Priority
OWR-02	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	0	2	Low Priority
OWR-03	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	0	2	Low Priority
OWR-20	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	0	2	Low Priority
OWR-19	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	0	2	Low Priority
OWR-14	MA62-24	Winnetuxet River	0	0	0	0	0	0	2	0	2	Low Priority
OW-22	MA62119	Monponsett Pond (West)	0	0	0	0	0	0	2	0	2	Low Priority
OW-20	MA62119	Monponsett Pond (West)	0	0	0	0	0	0	2	0	2	Low Priority

Scoring Criteria:

[1] Previous reports of dumping, failing septic systems, odors, or other indications of potential illicit discharges.

[2] Outfalls/interconnections that discharge to or in the vicinity of any of the following areas, as determined via GIS evaluation of the following datalayers. Note: Discharges to an area of concern to public health will automatically be considered High Priority.

a. Public Beaches: https://docs.digital.mass.gov/dataset/massgis-data-marine-beaches
b. Recreational Areas (note: query layer for only PRIM_PURP = "R" to only review areas protected for recreation primarily): https://docs.digital.mass.gov/dataset/massgis-data-protected-and-recreational-openspace
c. Drinking Water Supplies: https://docs.digital.mass.gov/dataset/massgis-data-surface-water-supply-watersheds
d. Shellfish Beds: https://docs.digital.mass.gov/dataset/massgis-data-designated-shellfish-growing-areas

[3] Receiving water quality based on latest version of MassDEP Integrated List of Waters: https://www.mass.gov/lists/integrated-lists-of-waters-related-reports

- Bacteria: Discharges to waters or their tributaries listed as impaired for bacteria (Category 4a or 5 Waters). This may include waters impaired for Fecal Coliform or Escherichia coli.
  - Note: Discharges to bacteria impaired waters will automatically be considered High Priority, based on guidance provided in Appendix H of the 2016 Permit
- Other: Discharges to waters or their tributaries listed as impaired for pollutants other than bacteria (Category 4a or 5 Waters). This does not include waters impaired for non-pollutants.
- None: Discharges to waters or their tributaries with no water quality impairments (Category 2 or 3 Waters)

[4]Discharges to waters with an approved TMDL where illicit discharges have the potential to contain the pollutant identified as the cause of the impairment. Listing of approved TMDLs can be found here: https://www.mass.gov/lists/total-maximum-daily-loads-by-watershed

[5] Density of generating sites based on MassGIS Land Use layer: https://docs.digital.mass.gov/dataset/massgis-data-land-use-2005

- High Density: Catchment area contains any of the following Land Use Codes = 10, Multi-Family Residential; 11, High Density Residential; 15, Commercial; 16, Industrial; 17, Transitional; 18, Transportation; 19, Waste Disposal; 31, Urban Public/Institutional; 36, Nursery; 39, Junkyard
  - Note: Discharges with known sites with the high potential to generate pollutants that could contribute to illicit discharges within its catchment area should be included in this category. Examples include by are not limited to: car dealers, car washes, gas stations, garden centers, and industrial manufacturing areas.
- Medium Density: 50% or more of catchment area is made of up of Land Use Codes = 5, Mining; 7, Participation Recreation; 8, Spectator Recreation; 9, Water-Based Recreation; 12, Medium Density Residential; 13, Low Density Residential; 26, Golf Course; 29, Marina
- Low Density: 50% or more of catchment area is made of up of Land Use Codes = 1, Cropland; 2, Pasture; 3, Forest; 4, Non-Forested Wetland; 6, Open Land; 14, Saltwater Wetland, 20, Water; 23, Cranberry Bog; 24, Powerline/Utility; 25, Saltwater Sandy Beach; 34, Cemetery; 35, Orchard; 37, Forested Wetland; 38, Very Low Density Residential; 40, Brushland/Successional

6 Dry Weather Outfall Screening and Sampling

Dry weather flow is a common indicator of potential illicit connections. The MS4 Permit requires all outfalls/interconnections (excluding Problem and excluded Outfalls) to be inspected for the presence of dry weather flow. The Division of Engineering is responsible for conducting dry weather outfall screening, starting with High Priority outfalls, followed by Low Priority outfalls, based on the initial priority rankings described in the previous section.

6.1 Weather Conditions

Dry weather outfall screening and sampling may occur when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period and no significant snow melt is occurring. For purposes of determining dry weather conditions, program staff will use precipitation data from the Town of Halifax EMA weather station (KMAHLIF3). If Town of Halifax EMA station is not available or not reporting current weather data, then Turkey Swamp Yacht Club (KMAHALIF2) will be used as a back-up.

6.2 Dry Weather Screening/Sampling Procedure

6.2.1 General Procedure

The dry weather outfall inspection and sampling procedure consists of the following general steps:

1. Identify outfall(s) to be screened/sampled based on initial outfall inventory and priority ranking
2. Acquire the necessary staff, mapping, and field equipment (see **Table 6-1** for list of potential field equipment)
3. Conduct the outfall inspection during dry weather:
    a. Mark and photograph the outfall
    b. Record the inspection information and outfall characteristics (using paper forms or digital form using a tablet or similar device) (see form in **Appendix A**).
    c. Look for and record visual/olfactory evidence of pollutants in flowing outfalls including odor, color, turbidity, and floatable matter (suds, bubbles, excrement, toilet paper or sanitary products). Also observe outfalls for deposits and stains, vegetation, and damage to outfall structures.
4. If flow is observed, sample and test the flow following the procedures described in the following sections.
5. If no flow is observed, but evidence of illicit flow exists (illicit discharges are often intermittent or transitory), revisit the outfall during dry weather within one week of the initial observation, if practicable, to perform a second dry weather screening and sample any observed flow. Other techniques can be used to detect intermittent or transitory flows including conducting inspections during evenings or weekends and using optical brighteners.
6. Input results from screening and sampling into spreadsheet/database. Include pertinent information in the outfall/interconnection inventory and priority ranking.
7. Include all screening data in the annual report.

Previous outfall screening/sampling conducted under the 2013 MS4 Permit may be used to satisfy the dry weather outfall/screening requirements of the 2016 MS4 Permit only if the previous screening and sampling was substantially equivalent to that required by the 2016 MS4 Permit, including the list of analytes outlined in Section 2.3.4.7.b.iii.4 of the 2016 permit.

6.2.2 Field Equipment

Table 6-1 lists field equipment commonly used for dry weather outfall screening and sampling.

Table 6-1. Field Equipment – Dry Weather Outfall Screening and Sampling

Equipment	Use/Notes
Clipboard	For organization of field sheets and writing surface
Field Sheets	Field sheets for both dry weather inspection and Dry weather sampling should be available with extras
Chain of Custody Forms	To ensure proper handling of all samples
Pens/Pencils/Permanent Markers	For proper labeling
Nitrile Gloves	To protect the sampler as well as the sample from contamination
Flashlight/headlamp w/batteries	For looking in outfalls or manholes, helpful in early mornings as well
Cooler with Ice	For transporting samples to the laboratory
Digital Camera	For documenting field conditions at time of inspection
Personal Protective Equipment (PPE)	Reflective vest, Safety glasses and boots at a minimum
GPS Receiver	For taking spatial location data
Water Quality Sonde	If needed, for sampling conductivity, temperature, pH
Water Quality Meter	Hand held meter, if available, for testing for various water quality parameters such as ammonia, surfactants and chlorine
Test Kits	Have extra kits on hand to sample more outfalls than are anticipated to be screened in a single day
Label Tape	For labeling sample containers
Sample Containers	Make sure all sample containers are clean. Keep extra sample containers on hand at all times. Make sure there are proper sample containers for what is being sampled for (i.e., bacteria requires sterile containers).
Pry Bar or Pick	For opening catch basins and manholes when necessary
Sandbags	For damming low flows in order to take samples
Small Mallet or Hammer	Helping to free stuck manhole and catch basin covers
Utility Knife	Multiple uses
Measuring Tape	Measuring distances and depth of flow
Safety Cones	Safety
Hand Sanitizer	Disinfectant/decontaminant
Zip Ties/Duct Tape	For making field repairs
Rubber Boots/Waders	For accessing shallow streams/areas
Sampling Pole/Dipper/Sampling Cage	For accessing hard to reach outfalls and manholes

6.2.3 Sample Collection and Analysis

If flow is present during a dry weather outfall inspection, a sample will be collected and analyzed for the required permit parameters[3] listed in **Table 6-2**. The general procedure for collection of outfall samples is as follows:

1. At least one day prior to outfall sampling, coordinate with G&L Laboratories, Inc. to schedule the laboratory analysis. This coordination will include the time of delivery and number of samples expected to be sent for analysis.
2. Fill out all sample information on sample bottles and field sheets (see **Appendix A** for Sample Labels and Field Sheets)
3. Put on protective gloves (nitrile/latex/other) before sampling
4. Collect sample with dipper or directly in sample containers. If possible, collect water from the flow directly in the sample bottle. Be careful not to disturb sediments.
5. If using a dipper or other device, triple rinse the device with distilled water and then in water to be sampled (not for bacteria sampling)
6. Use test strips, test kits, and field meters (rinse similar to dipper) for most parameters (see **Table 6-2**)
7. Place laboratory samples on ice for analysis of bacteria and pollutants of concern
8. Fill out chain-of-custody form (**Appendix A**) for laboratory samples
9. Contact G&L Laboratories, Inc for lab sample pick up
10. Dispose of used test strips and test kit ampules properly
11. Decontaminate all testing personnel and equipment

In the event that an outfall is submerged, either partially or completely, or inaccessible, field staff will proceed to the first accessible upstream manhole or structure for the observation and sampling and report the location with the screening results. Field staff will continue to the next upstream structure until there is no longer an influence from the receiving water on the visual inspection or sampling.

Field test kits or field instrumentation are permitted for all parameters except indicator bacteria and any pollutants of concern. Field kits need to have appropriate detection limits and ranges. **Table 6-2** lists various field test kits and field instruments that can be used for outfall sampling associated with the 2016 MS4 Permit parameters, other than indicator bacteria and any pollutants of concern.

[3] Other potentially useful parameters, although not required by the MS4 Permit, include **fluoride** (indicator of potable water sources in areas where water supplies are fluoridated), **potassium** (high levels may indicate the presence of sanitary wastewater), and **optical brighteners** (indicative of laundry detergents).

Table 6-2. Sampling Parameters and Analysis Methods

Analyte or Parameter	Instrumentation (Portable Meter)	Field Test Kit
Ammonia	CHEMetrics™ V-2000 Colorimeter Hach™ DR/890 Colorimeter Hach™ Pocket Colorimeter™ II	CHEMetrics™ K-1410 CHEMetrics™ K-1510 (series) Hach™ NI-SA Hach™ Ammonia Test Strips
Surfactants (Detergents)	CHEMetrics™ I-2017	CHEMetrics™ K-9400 and K-9404 Hach™ DE-2
Chlorine	CHEMetrics™ V-2000, K-2513 Hach™ Pocket Colorimeter™ II	NA
Conductivity	CHEMetrics™ I-1200 YSI Pro30 YSI EC300A Oakton 450	NA
Temperature	YSI Pro30 YSI EC300A Oakton 450	NA
Salinity	YSI Pro30 YSI EC300A Oakton 450	NA
Temperature	YSI Pro30 YSI EC300A Oakton 450	NA
Indicator Bacteria: *E. coli* (freshwater) or Enterococcus (saline water)	EPA certified laboratory procedure (40 CFR § 136)	NA
Pollutants of Concern[1]	EPA certified laboratory procedure (40 CFR § 136)	NA

[1] Where the discharge is directly into a water quality limited water or a water subject to an approved TMDL, the sample must be analyzed for the pollutant(s) of concern identified as the cause of the water quality impairment.

Testing for indicator bacteria and any pollutants of concern must be conducted using analytical methods and procedures found in 40 CFR § 136.[4] Samples for laboratory analysis must also be stored and preserved in accordance with procedures found in 40 CFR § 136. **Table 6-3** lists analytical methods, detection limits, hold times, and preservatives for laboratory analysis of dry weather sampling parameters.

[4] 40 CFR § 136: http://www.ecfr.gov/cgi-bin/text-idx?SID=b3b41fdea0b7b0b8cd6c4304d86271b7&mc=true&node=pt40.25.136&rgn=div5

Table 6-3. Required Analytical Methods, Detection Limits, Hold Times, and Preservatives[4]

Analyte or Parameter	Analytical Method	Detection Limit	Max. Hold Time	Preservative
Ammonia	**EPA**: 350.2, **SM**: 4500-NH3C	0.05 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2, No preservative required if analyzed immediately
Surfactants	**SM**: 5540-C	0.01 mg/L	48 hours	Cool ≤6°C
Chlorine	**SM**: 4500-Cl G	0.02 mg/L	Analyze within 15 minutes	None Required
Temperature	**SM**: 2550B	*NA*	Immediate	None Required
Specific Conductance	**EPA**: 120.1, **SM**: 2510B	0.2 µs/cm	28 days	Cool ≤6°C
Salinity	**SM**: 2520	-	28 days	Cool ≤6°C
Indicator Bacteria: *E.coli* Enterococcus	*E.coli* **EPA**: 1603 **SM**: 9221B, 9221F , 9223 B **Other**: Colilert®, Colilert-18® *Enterococcus* **EPA**: 1600 **SM**: 9230 C **Other**: Enterolert®	*E.coli* **EPA**: 1 cfu/100mL **SM**: 2 MPN/100mL **Other**: 1 MPN/100mL *Enterococcus* **EPA**: 1 cfu/100mL **SM**: 1 MPN/100mL **Other**: 1 MPN/100mL	8 hours	Cool ≤10°C, 0.0008% $Na_2S_2O_3$
Total Phosphorus	**EPA**: Manual-365.3, Automated Ascorbic acid digestion-365.1 Rev. 2, ICP/AES4-200.7 Rev. 4.4 **SM**: 4500-P E-F	**EPA**: 0.01 mg/L **SM** : 0.01 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2
Total Nitrogen (Ammonia + Nitrate/Nitrite, methods are for Nitrate-Nitrite and need to be combined with Ammonia listed above.)	**EPA**: Cadmium reduction (automated)-353.2 Rev. 2.0, **SM**: 4500-NO_3 E-F	**EPA**: 0.05 mg/L **SM** : 0.05 mg/L	28 days	Cool ≤6°C, H_2SO_4 to pH <2

SM = Standard Methods

6.3 Interpreting Outfall Sampling Results

Outfall analytical data from dry weather sampling can be used to help identify the major type or source of discharge. **Table 6-4** shows values identified by the U.S. EPA and the Center for Watershed Protection as typical screening values for select parameters. These represent the typical concentration (or value) of each parameter expected to be found in stormwater. Screening values that exceed these benchmarks may be indicative of pollution and/or illicit discharges.

Table 6-4. Benchmark Field Measurements for Select Parameters

Analyte or Parameter	Benchmark
Ammonia	>0.5 mg/L
Conductivity	>2,000 µS/cm
Surfactants	>0.25 mg/L
Chlorine	>0.02 mg/L (detectable levels per the 2016 MS4 Permit)
Indicator Bacteria[5]: *E.coli* *Enterococcus*	*E.coli*: the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 126 colonies per 100 ml and no single sample taken during the bathing season shall exceed 235 colonies per 100 ml *Enterococcus:* the geometric mean of the five most recent samples taken during the same bathing season shall not exceed 33 colonies per 100 ml and no single sample taken during the bathing season shall exceed 61 colonies per 100 ml

6.4 Follow-up Ranking of Outfalls and Interconnections

Halifax will update and re-prioritize the initial outfall and interconnection rankings based on information gathered during dry weather screening. The rankings will be updated periodically as dry weather screening information becomes available, but will be completed within three (3) years of the effective date of the permit (July 1, 2021).

Outfalls/interconnections where relevant information was found indicating sewer input to the MS4 or sampling results indicating sewer input are highly likely to contain illicit discharges from sanitary sources. Such outfalls/interconnections will be ranked at the top of the High Priority Outfalls category for investigation. Other outfalls and interconnections may be re-ranked based on any new information from the dry weather screening.

[5] Massachusetts Water Quality Standards: http://www.mass.gov/eea/docs/dep/service/regulations/314cmr04.pdf

7 Catchment Investigations

Once stormwater outfalls with evidence of illicit discharges have been identified, various methods can be used to trace the source of the potential discharge within the outfall catchment area. Catchment investigation techniques include but are not limited to review of maps, historic plans, and records; manhole observation; dry and wet weather sampling; video inspection; smoke testing; and dye testing. This section outlines a systematic procedure to investigate outfall catchments to trace the source of potential illicit discharges. All data collected as part of the catchment investigations will be recorded and reported in each annual report.

7.1 System Vulnerability Factors

The Highway Department will review relevant mapping and historic plans and records to identify areas within the catchment with higher potential for illicit connections. The following information will be reviewed:

- Plans related to the construction of the drainage network
- Prior work on storm drains
- Board of Health or other municipal data on septic systems
- Complaint records related to SSOs
- Septic system breakouts.

Based on the review of this information, the presence of any of the following **System Vulnerability Factors (SVFs)** will be identified for each catchment:

- History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages
- Any storm drain infrastructure greater than 40 years old
- Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance)
- History of multiple Board of Health actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance).

A SVF inventory will be documented for each catchment (see **Table 7-1**), retained as part of this IDDE Plan, and included in the annual report.

Table 7-1. Outfall Catchment System Vulnerability Factor (SVF) Inventory

Halifax, Massachusetts
Revision Date: TO BE UPDATED

Outfall ID	Receiving Water	1 History of SSOs	2 Storm Drain Infrastructure >40 years Old	3 Septic with Poor Soils or Water Table Separation	4 History of BOH Actions Addressing Septic Failure
Sample 1	XYZ River	Yes/No	Yes/No	Yes/No	Yes/No

Presence/Absence Evaluation Criteria:

1. History of SSOs, including, but not limited to, those resulting from wet weather, high water table, or fat/oil/grease blockages
2. Any storm drain infrastructure greater than 40 years old
3. Widespread code-required septic system upgrades required at property transfers (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance)
4. History of multiple Board of Health actions addressing widespread septic system failures (indicative of inadequate soils, water table separation, or other physical constraints of the area rather that poor owner maintenance)

7.2 Dry Weather Manhole Inspections

Halifax will implement a dry weather storm drain network investigation that involves systematically and progressively observing, sampling and evaluating key junction manholes in the MS4 to determine the approximate location of suspected illicit discharges or SSOs.

The Highway Department will be responsible for implementing the dry weather manhole inspection program and making updates as necessary. Infrastructure information will be incorporated into the storm system map, and catchment delineations will be refined based on the field investigation, where necessary. The SVF inventory will also be updated based on information obtained during the field investigations, where necessary.

Several important terms related to the dry weather manhole inspection program are defined by the MS4 Permit as follows:

- **Junction Manhole** is a manhole or structure with two or more inlets accepting flow from two or more MS4 alignments. Manholes with inlets solely from private storm drains, individual catch basins, or both are not considered junction manholes for these purposes.

- **Key Junction Manholes** are those junction manholes that can represent one or more junction manholes without compromising adequate implementation of the illicit discharge program. Adequate implementation of the illicit discharge program would not be compromised if the exclusion of a particular junction manhole as a key junction manhole would not affect the permittee's ability to determine the possible presence of an upstream illicit discharge. A permittee may exclude a junction manhole located upstream from another located in the immediate vicinity or that is serving a drainage alignment with no potential for illicit connections.

For all catchments identified for investigation, during dry weather, field crews will systematically inspect **key junction manholes** for evidence of illicit discharges. This program involves progressive inspection and sampling at manholes in the storm drain network to isolate and eliminate illicit discharges.

The manhole inspection methodology will be conducted in one of two ways (or a combination of both):

- By working progressively up from the outfall and inspecting key junction manholes along the way, or
- By working progressively down from the upper parts of the catchment toward the outfall.

For most catchments, manhole inspections will proceed from the outfall moving up into the system. However, the decision to move up or down the system depends on the nature of the drainage system and the surrounding land use and the availability of information on the catchment and drainage system. Moving up the system can begin immediately when an illicit discharge is detected at an outfall, and only a map of the storm drain system is required. Moving down the system requires more advance preparation and reliable drainage system information on the upstream segments of the storm drain system, but may be more efficient if the sources of illicit discharges are believed to be located in the upstream portions of the catchment area. Once a manhole inspection methodology has been selected, investigations will continue systematically through the catchment.

Inspection of key junction manholes will proceed as follows:

1. Manholes will be opened and inspected for visual and olfactory evidence of illicit connections. A sample field inspection form is provided in **Appendix A**.

2. If flow is observed, a sample will be collected and analyzed at a minimum for ammonia, chlorine, and surfactants. Field kits can be used for these analyses. Sampling and analysis will be in accordance with procedures outlined in **Section 6**. Additional indicator sampling may assist in determining potential sources (e.g., bacteria for sanitary flows, conductivity to detect tidal backwater, etc.).

3. Where sampling results or visual or olfactory evidence indicate potential illicit discharges or SSOs, the area draining to the junction manhole will be flagged for further upstream manhole investigation and/or isolation and confirmation of sources.

4. Subsequent key junction manhole inspections will proceed until the location of suspected illicit discharges or SSOs can be isolated to a pipe segment between two manholes.

5. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completion of key junction manhole sampling.

7.3 Wet Weather Outfall Sampling

Where a minimum of one (1) System Vulnerability Factor (SVF) is identified based on previous information or the catchment investigation, a wet weather investigation must also be conducted at the associated outfall. The Highway Department will be responsible for implementing the wet weather outfall sampling program and making updates as necessary.

Outfalls will be inspected and sampled under wet weather conditions, to the extent necessary, to determine whether wet weather-induced high flows in sanitary sewers or high groundwater in areas served by septic systems result in discharges of sanitary flow to the MS4.

Wet weather outfall sampling will proceed as follows:

1. At least one wet weather sample will be collected at the outfall for the same parameters required during dry weather screening.

2. Wet weather sampling will occur during or after a storm event of sufficient depth or intensity to produce a stormwater discharge at the outfall. There is no specific rainfall amount that will trigger sampling. To the extent feasible, sampling should occur during the spring (March through June) when groundwater levels are relatively high.

3. If wet weather outfall sampling indicates a potential illicit discharge, then additional wet weather source sampling will be performed, as warranted, or source isolation and confirmation procedures will be followed as described in **Section 7.4**.

4. If wet weather outfall sampling does not identify evidence of illicit discharges, and no evidence of an illicit discharge is found during dry weather manhole inspections, catchment investigations will be considered complete.

7.4 Source Isolation and Confirmation

Once the source of an illicit discharge is approximated between two manholes, more detailed investigation techniques will be used to isolate and confirm the source of the illicit discharge. The following methods may be used in isolating and confirming the source of illicit discharges

- Sandbagging

- Smoke Testing
- Dye Testing
- CCTV/Video Inspections
- Optical Brightener Monitoring
- IDDE Canines

These methods are described in the sections below.

Public notification is an important aspect of a detailed source investigation program. Prior to smoke testing, dye testing, or TV inspections, the Highway Department will notify property owners in the affected area. Smoke testing notification will include a letter delivered to the property for single family homes, businesses and building lobbies for multi-family dwellings.

7.4.1 Sandbagging

This technique can be particularly useful when attempting to isolate intermittent illicit discharges or those with very little perceptible flow. The technique involves placing sandbags or similar barriers (e.g., caulking, weirs/plates, or other temporary barriers) within outlets to manholes to form a temporary dam that collects any intermittent flows that may occur. Sandbags are typically left in place for 48 hours, and should only be installed when dry weather is forecast. If flow has collected behind the sandbags/barriers after 48 hours it can be assessed using visual observations or by sampling. If no flow collects behind the sandbag, the upstream pipe network can be ruled out as a source of the intermittent discharge. Finding appropriate durations of dry weather and the need for multiple trips to each manhole makes this method both time-consuming and somewhat limiting.

7.4.2 Smoke Testing

Smoke testing involves injecting non-toxic smoke into drain lines and noting the emergence of smoke from sanitary sewer vents in illegally connected buildings or from cracks and leaks in the system itself. Typically a smoke bomb or smoke generator is used to inject the smoke into the system at a catch basin or manhole and air is then forced through the system. Test personnel are place in areas where there are suspected illegal connections or cracks/leaks, noting any escape of smoke (indicating an illicit connection or damaged storm drain infrastructure). It is important when using this technique to make proper notifications to area residents and business owners as well as local police and fire departments.

If the initial test of the storm drain system is unsuccessful then a more thorough smoke-test of the sanitary sewer lines can also be performed. Unlike storm drain smoke tests, buildings that do not emit smoke during sanitary sewer smoke tests may have problem connections and may also have sewer gas venting inside, which is hazardous.

It should be noted that smoke may cause minor irritation of respiratory passages. Residents with respiratory conditions may need to be monitored or evacuated from the area of testing altogether to ensure safety during testing.

7.4.3 Dye Testing

Dye testing involves flushing non-toxic dye into plumbing fixtures such as toilets, showers, and sinks and observing nearby storm drains and sewer manholes as well as stormwater outfalls for the presence of the dye. Similar to smoke testing, it is important to inform local residents and business owners. Police, fire, and local public health staff should also be notified prior to testing in preparation of responding to citizen phone calls concerning the dye and their presence in local surface waters.

A team of two or more people is needed to perform dye testing (ideally, all with two-way radios). One person is inside the building, while the others are stationed at the appropriate storm sewer and sanitary sewer manholes (which should be opened) and/or outfalls. The person inside the building adds dye into a plumbing fixture (i.e., toilet or sink) and runs a sufficient amount of water to move the dye through the plumbing system. The person inside the building then radios to the outside crew that the dye has been dropped, and the outside crew watches for the dye in the storm sewer and sanitary sewer, recording the presence or absence of the dye.

The test can be relatively quick (about 30 minutes per test), effective (results are usually definitive), and inexpensive. Dye testing is best used when the likely source of an illicit discharge has been narrowed down to a few specific houses or businesses.

7.4.4 CCTV/Video Inspection

Another method of source isolation involves the use of mobile video cameras that are guided remotely through stormwater drain lines to observe possible illicit discharges. IDDE program staff can review the videos and note any visible illicit discharges. While this tool is both effective and usually definitive, it can be costly and time consuming when compared to other source isolation techniques.

7.4.5 Optical Brightener Monitoring

Optical brighteners are fluorescent dyes that are used in detergents and paper products to enhance their appearance. The presence of optical brighteners in surface waters or dry weather discharges suggests there is a possible illicit discharge or insufficient removal through adsorption in nearby septic systems or wastewater treatment. Optical brightener monitoring can be done in two ways. The most common, and least expensive, methodology involves placing a cotton pad in a wire cage and securing it in a pipe, manhole, catch basin, or inlet to capture intermittent dry weather flows. The pad is retrieved at a later date and placed under UV light to determine the presence/absence of brighteners during the monitoring period. A second methodology uses handheld fluorometers to detect optical brighteners in water sample collected from outfalls or ambient surface waters. Use of a fluorometer, while more quantitative, is typically more costly and is not as effective at isolating intermittent discharges as other source isolation techniques.

7.4.6 IDDE Canines

Dogs specifically trained to smell human related sewage are becoming a cost-effective way to isolate and identify sources of illicit discharges. While not widespread at the moment, the use of IDDE canines is growing as is their accuracy. The use of IDDE canines is not recommended as a standalone practice for

source identification; rather it is recommended as a tool to supplement other conventional methods, such as dye testing, in order to fully verify sources of illicit discharges.

7.5 Illicit Discharge Removal

When the specific source of an illicit discharge is identified, Halifax will exercise its authority as necessary to require its removal. The annual report will include the status of IDDE investigation and removal activities including the following information for each confirmed source:

- The location of the discharge and its source(s)
- A description of the discharge
- The method of discovery
- Date of discovery
- Date of elimination, mitigation or enforcement action OR planned corrective measures and a schedule for completing the illicit discharge removal
- Estimate of the volume of flow removed.

7.5.1 Confirmatory Outfall Screening

Within one (1) year of removal of all identified illicit discharges within a catchment area, confirmatory outfall or interconnection screening will be conducted. The confirmatory screening will be conducted in dry weather unless System Vulnerability Factors have been identified, in which case both dry weather and wet weather confirmatory screening will be conducted. If confirmatory screening indicates evidence of additional illicit discharges, the catchment will be scheduled for additional investigation.

7.6 Ongoing Screening

Upon completion of all catchment investigations and illicit discharge removal and confirmation (if necessary), each outfall or interconnection will be re-prioritized for screening and scheduled for ongoing screening once every five (5) years. Ongoing screening will consist of dry weather screening and sampling consistent with the procedures described in **Section 6** of this plan. Ongoing wet weather screening and sampling will also be conducted at outfalls where wet weather screening was required due to System Vulnerability Factors and will be conducted in accordance with the procedures described in **Section 7.3**. All sampling results will be reported in the annual report.

8 Training

Annual IDDE training will be made available to all employees involved in the IDDE program. This training will at a minimum include information on how to identify illicit discharges and SSOs and may also include additional training specific to the functions of particular personnel and their function within the framework of the IDDE program. Training records will be maintained in **Appendix B**. The frequency and type of training will be included in the annual report.

9 Progress Reporting

The progress and success of the IDDE program will be evaluated on an annual basis. The evaluation will be documented in the annual report and will include the following indicators of program progress:

- Number of SSOs and illicit discharges identified and removed
- Number and percent of total outfall catchments served by the MS4 evaluated using the catchment investigation procedure
- Number of dry weather outfall inspections/screenings
- Number of wet weather outfall inspections/sampling events
- Number of enforcement notices issued
- All dry weather and wet weather screening and sampling results
- Estimate of the volume of sewage removed, as applicable
- Number of employees trained annually.

The success of the IDDE program will be measured by the IDDE activities completed within the required permit timelines.

Appendix A

Field Forms, Sample Bottle Labels, and Chain of Custody Forms

Halifax Bottle Label

Halifax Water Quality Sampling Program Sample

Date/Time:_____ Sample ID:_____

Sample Type: W or D

Laboratory Analysis: _____

Preservative_____

Collected By: _____

Halifax Inspection From

IDDE Outfall Screening Form	
Date of Inspection:	Date of Last Storm:
Start Time:	End Time:
Inspector Name:	
Type of Inspection: ☐ Dry Weather ☐ Wet Weather	
Structure Found: ☐ Yes ☐ No	
Outfall Condition:	
Outfall Condition: ☐ Good: Inspect Within 2 Years ☐ Fair: Inspect Within 1 Year ☐ Failing: Requires Immediate Action ☐ Poor: Requires Maintenance ☐ Unknown	
Sedimentation: ☐ No Sedimentation ☐ Slight Sedimentation ☐ High Sedimentation	
IDDE Class: ☐ Potential ☐ Obvious ☐ Unlikely	
Reason for Illicit Suspicion:	
Visual Inspection:	
Staining: ☐ No Staining ☐ Some Staining ☐ Significant Staining	
Scour Protection Condition: ☐ Good: Inspect Within 2 Years ☐ Fair: Inspect Within 1 Year ☐ Failing: Requires Immediate Action ☐ Poor: Requires Maintenance ☐ Unknown	
Vegetative Growth: ☐ None ☐ < 25% Vegetated ☐ < 50% Vegetated ☐ 50% Vegetated ☐ > 50% Vegetated ☐ 100% Vegetated	
Flow: ☐ Yes ☐ No	Flow Clarity: ☐ Clear ☐ Cloudy ☐ Opaque
Color of Flow: ☐ N/A ☒ Clear ☐ Tea/Coffee ☐ Clear Black ☐ Orange-Red ☐ Tan to Light Brown ☐ Milky/Dirty Dishwater Gray ☐ Milky White ☐ White Crusty Deposits ☐ Greenish-Bluish ☐ Blue ☐ Purple ☐ Dark Red ☐ Other (describe in notes)	
Floatables: ☐ Yes ☐ No	Sewage, Sheens & Scum: ☐ Yes ☐ No
Odor: ☐ None ☐ Rotten Eggs/Hydrogen Sulfide ☐ Musty Odor ☐ Sharp, Pungent Odor ☐ Sweet, Fruit ☐ Gasoline, Petroleum ☐ Chlorine ☐ Other (describe in notes)	
Water Quality Sampling	
Temperature (deg C):	Conductivity (micro-Siemens/cm):
pH:	Salinity (ppm):
Ammonia (mg/L):	Chlorine (mg/L):
Surfactants (mg/L):	
Additional Parameters Screened:	
Sample for Lab Collected: ☐ Yes ☐ No	
Lab Sample 1 Test:	Lab Sample 1 Results:
Lab Sample 2 Test:	Lab Sample 2 Results:
Lab Sample 3 Test:	Lab Sample 3 Results:
Notes:	

Halifax Chain of Custody From

REPORT GOES TO	BILLING INFORMATION	INFORMATION FOR MA DEP
ATTENTION:	ATTENTION:	PWS ID:
COMPANY NAME:	COMPANY NAME:	PWS NAME:
ADDRESS:	ADDRESS:	PWS CLASS:
		TURN-AROUND TIME Ten Business days ____
E-MAIL:	E-MAIL:	RUSH (days): One___Two___Three___Four___Five__
PHONE: FAX:	PHONE: FAX:	REPORT DELIVERY Fax___e-mail___Hardcopy___

LAB ID	SAMPLE LOCATION / IDENTIFICATION (Street Address + City + State)	COLLECTION			MA DEP LOCATION ID or MAP +PARCEL	SAMPLE TYPE							SAMPLE MATRIX	# OF BOTTLES	ANALYSIS					COMMENT
		DATE	TIME	SAMPLER		Routine (RS)	Special (SS)	RO, UR, DR, AR, RW, PT	Multiple (M)	Single (S)	Raw (R)	Finish (F)			Routine [1]	Routine+VOC [2]				

Relinquished By:	Date/Time	Received By:	Date/Time	Container Type [3]		P	P, GV				Temp (°C)
				Preservative	HCl		√				See reverse side for Routine sampling instruction.
					HNO_3	√	√				
					Others [4]	S	S				

[1] Routine includes *pH, Nitrate, Total Coliform, Sodium, Copper, Iron, Conductance.*

[2] Routine+VOC (Real Estate Kit). VOC=Volatile Organic Compounds

[3] Container Type: P = Plastics; CG = Clear Glass; AG = Amber Glass; GV = Glass Vial

[4] H = H_2SO_4; T = $Na_2S_2O_3$ (THIO); S = Sterile; N = NaOH

Appendix B

IDDE Employee Training Record

Illicit Discharge Detection and Elimination (IDDE)
Employee Training Record

Halifax, Massachusetts

Date of Training: _____

Duration of Training: _____

Name	Title	Signature